



Allen-Bradley

SLC 500 DeviceNet Scanner Module

1747-SDN

DeviceNet[®]

User Manual

**Rockwell
Automation**

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this manual we use notes to make you aware of safety considerations:

ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss

Attention statements help you to:

- identify a hazard
- avoid a hazard
- recognize the consequences

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

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European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet the Council Directive 89/336/EC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 - Equipment Requirements and Tests. For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the Allen-Bradley publication Industrial Automation Wiring and Grounding Guidelines For Noise Immunity, publication 1770-4.1.

This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

About This User Manual

Introduction

This user manual is designed to provide you enough information to get a small example application up and running. Use this manual if you are knowledgeable about DeviceNet[™] and SLC 500[™] products, but may not have used the products in conjunction. The information provided is a base; modify or expand the examples to suit your particular needs.

The manual contains instructions on configuring a DeviceNet network using RSLinx and RSNetWorx for DeviceNet software. It also describes how to use the SLC-500 pass-through feature to communicate with the DeviceNet network for adjustment and tuning of network devices via other networks, including:

- Ethernet
- Data Highway Plus (DH+)

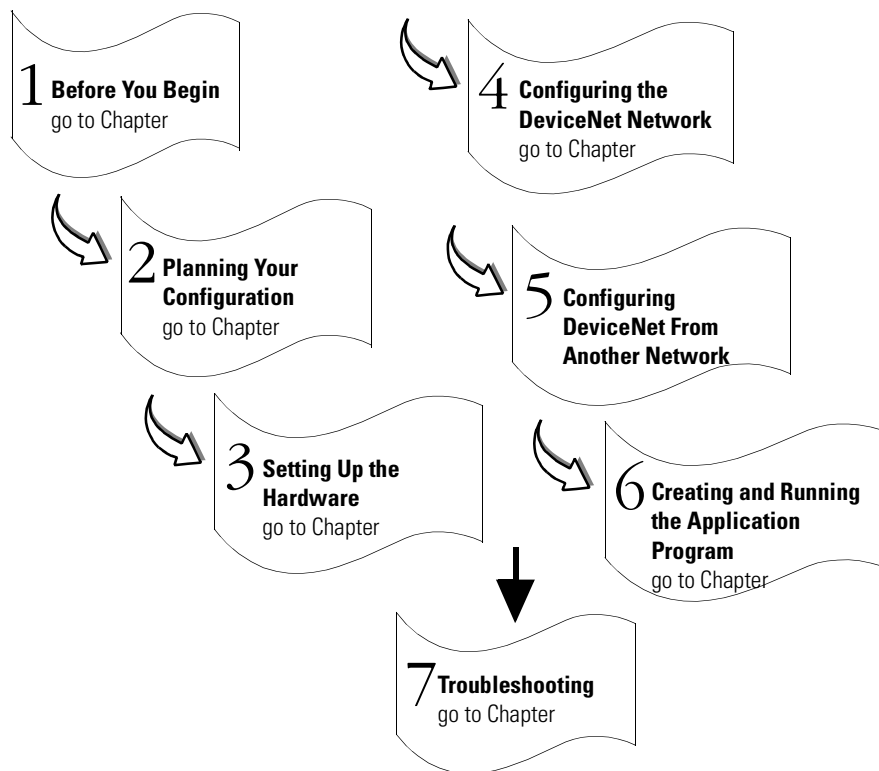
The example application demonstrates how to perform control on a DeviceNet network using an SLC 500 processor and the 1747-SDN module. You use RSLogix 500 programming software to create a ladder logic program to control a photoeye and a RediSTATION[™].

IMPORTANT

This User manual should be used in conjunction with the 1747-SDN DeviceNet Scanner Module Installation Instructions, publication 1747-5.8. The Installation Instructions contain important information on configuring your scanner.

Contents

This user manual contains the following chapters:



Audience

This manual is intended for control engineers and technicians who are installing, programming, and maintaining a control system that includes an SLC 500 processor communicating on a DeviceNet network through a 1747-SDN module.

We assume that you:

- are developing a DeviceNet network using a SLC 500 processor in conjunction with a 1747-SDN scanner module
- know each of your device's I/O parameters and requirements
- understand SLC™ processor programming and operation
- are experienced with the Microsoft® Windows™ environment
- are familiar with RSNetWorx for DeviceNet software

The Example Application

This manual describes how to set up an example application. The manual provides examples of each step of the setup, with references to other manuals for more details.

System Components

We used the following devices and software for the example application. For your own application, substitute your own devices to fit your needs. The recommended configurations in this user manual will help you set up the test system and get it working. Your eventual configuration will depend on your application.

Note: If you use different software or firmware versions of these products some of your screens may appear slightly different from those shown in the example.

	Product Name	Catalog Number	Series/Revision
Qty	Hardware		
1	SLC 500 Modular Chassis	1746-A4, -A7, -A10, -A13	B
1	SLC 500 Power Supply	1746-P1, -P2, -P3, -P4, -P5, -P6	-
1	SLC 5/04 Processor	1747-L541, -L542, -L543	-
1	SLC 5/05 Processor (Ethernet)	1747-L551, -L552, -L553	-
1	DeviceNet Scanner module	1747-SDN/B	B
1	ControlNet RS-232 Interface module	1747-KFC15	-
1	DeviceNet Quad-Tap	1492-DN3TW	-
1	RediSTATION operator interface module	2705-TxDN1x42x-xxxx	-
1	Series 9000 Photoeye	42GNU-9000 or equivalent	-
1	DeviceNet RS-232 Interface module	1770-KFD	-
1	RS-232 cables	1787-RSCABL/A (PC to 1770-KFD)	-
	DeviceNet dropline or trunk cables, as needed	1787-PCABL, -TCABL, -MCABL	-
1	24V Power Supply	any regulated 24VDC, 8A	-
1	PC	IBM-compatible Pentium+ Windows 95/98 or NT 4.0 with Service Pack 4	-
	Software		
	RSLogix 500	9324-RL0300xxx	Rev 4.00
	RSNetWorx for DeviceNet	9357-DNETL3	Rev 2.22
	RSLinx	9355-WAB	Rev 2.10

Common Techniques Used in This Manual

The following conventions are used throughout this manual:

- Bulleted lists provide information, not procedural steps.
- Numbered lists provide sequential steps.
- Information in **bold** contained within text identifies menu windows, or screen options, screen names and areas of the screen, such as dialog boxes, status bars, radio buttons and parameters.

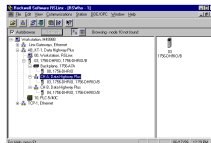
TIP

This symbol identifies helpful tips.



This is a definition box. When a word is bold within the text of a paragraph, a definition box will appear in the left margin to further define the text.

A **definition box** defines terms that may be unfamiliar to you.



Screen captures are pictures of the software's actual screens. The names of screen buttons and fields are often in bold in the text of a procedure. Pictures of keys represent the actual keys you press.



The “MORE” icon is placed beside any paragraph that references sources of additional information outside of this document.

Where to Find More Information



Refer to the following sources of information as needed for additional help when setting up and using your DeviceNet network:

For information about	See this	Item Number
the 1747-SDN DeviceNet Scanner module	DeviceNet Scanner Module Installation Instructions	1747-5.8
SLC 500 Processors	SLC 5/03, 5/04, and 5/05 Modular Processors	1747-5.27
SLC 500 Ethernet Processors	Quick Start for Experienced Users	1747-10.4
the ControlNet RS-232 Interface	SLC 500 ControlNet RS-232 Interface User Manual	1747-5.34
the SLC 500 Modular chassis	SLC 500 Modular Chassis Installation Instructions	1746-5.8
the 1770-KFD communication module	DeviceNet RS-232 Interface Module Installation Instructions	1770-5.6
a 1784-PCD communication card	NetLinx DeviceNet Communication Card Installation Instructions	1784-5.29
a 1784-PCID or 1784-PCIDS card	DeviceNet PCI Communication Interface Card Installation	1784-5.31
the RediSTATION	RediSTATION Operator Interface User Manual	2705-804
the 9000 Series photoeye	(refer to the documentation that came with your photoeye)	n/a
DeviceNet	DeviceNet System Overview	DN-2.5
	DeviceNet Design Manual (online)	DNET-AT-001A-EN
connecting the DeviceNet network	DeviceNet Cable Planning and Installation Manual	DN-6.7.2
	DeviceNet Cable Planning and Installation Release Note 1	DN-6.7.2-RN1
RSLogix 500 software	Getting Results With RSLogix 500	9399-RL50GR
RSLinx software	Getting Results with RSLinx	9399-WAB32GR
RSNetWorx for DeviceNet software	RSNetWorx for DeviceNet Demo CD	9398-DNETDEMO
terms and definitions	Allen-Bradley Industrial Automation Glossary	AG-7.1

TIP



Many of these manuals are available online from the Automation Bookstore,
<http://www.theautomationbookstore.com>.

TIP



For more information about Rockwell Software products, visit the Rockwell Software internet site:
<http://www.software.rockwell.com>.

Terminology

This term	Means
Bridge	The scanner module's support of explicit message transfer.
Change of State	A type of I/O data communication. The scanner module can send and receive data with slave devices that have the change of state feature. Data is sent whenever a data change occurs. Data is updated at the rate of the heartbeat.
Cyclic	A type of I/O data communication. The scanner module can send and receive data with slave devices that have the cyclic feature. Data is only sent at a user-configurable rate.
Dual Mode	The scanner module is in dual mode when it serves as a master to one or more slaves and as a slave to another master simultaneously.
EDS	Electronic Data Sheet. A vendor-supplied template that specifies how information is displayed as well as what is an appropriate entry (value).
Explicit Messaging	A type of messaging used for lower priority tasks, such as configuration and data monitoring.
Heartbeat Rate	Devices that are configured for change of state data can also send a "heartbeat" signal to indicate proper operation.
Host Platform	The computer on which the application software is run.
I/O	An abbreviation for "input and output".
Implicit Messaging	The type of messaging used for high priority I/O control data; e.g., change of state, cyclic, polled, or strobed.
Input Data	Data produced by a DeviceNet device and collected by the scanner module for the host platform to read.
MAC ID	The network address of a DeviceNet node.
Network	The DeviceNet network or the RSNetWorx for DeviceNet software representation of the network.
Node	Hardware that is assigned a single address on the network (also referred to as a "device").
Offline	When the host platform is not communicating on the network.
Online	When the host platform is configured and enabled to communicate on the network.
Output Data	Data produced by the host platform that is written to the scanner module's memory. This data is sent by the scanner module to DeviceNet devices.
PC	Abbreviation for an IBM® compatible personal-computer.
Polled	A type of input/output-data communication. A polled message solicits a response from a single, specified device on the network (a point-to-point transfer of data).
Processor	The SLC 500 programmable controller.
Record	The node address and channel-specific memory assigned in the scanner module's non-volatile storage for a node in the scanlist.
Rx	An abbreviation for "receive".
Scanlist	The list of devices (nodes) with which the scanner is configured to exchange I/O data.
Scanner	The function of the 1747-SDN module to support the exchange of I/O with slave modules.
Slave Mode	The 1747-SDN module is in slave mode when it is placed in another 1747-SDN module's scanlist as a slave device.

Strobed	A type of I/O data communication. A strobed message solicits a response from each strobed device (a multicast transfer). It is a 64-bit message that contains one bit for each device on the network.
Tx	An abbreviation for "transmit".

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Contact your local Rockwell Automation representative for:

- sales and order support
- product technical training
- warranty support
- support service agreements

Technical Product Assistance

If you need to contact Rockwell Automation for technical assistance, call your local Rockwell Automation representative, or call Rockwell directly at: 1 440 646-6800.

For presales support, call 1 440 646-3NET.

You can obtain technical assistance online from the following Rockwell Automation WEB sites:

- www.ab.com/mem/technotes/kbhome.html (knowledge base)
- www.ab.com/networks/eds (electronic data sheets)

Your Questions or Comments about This Manual

If you find a problem with this manual, please notify us of it on the enclosed Publication Problem Report (at the back of this manual).

If you have any suggestions about how we can make this manual more useful to you, please contact us at the following address:

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Mayfield Heights, OH 44124-6118

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Before You Begin

What This Chapter Contains

This chapter provides an overview of communication between the SLC 500 processor and DeviceNet devices via the 1747-SDN module. The configuration data tables and the RSNetWorx for DeviceNet screens and windows used to configure the data tables are also described.

The following table identifies what this chapter contains and where to find specific information.

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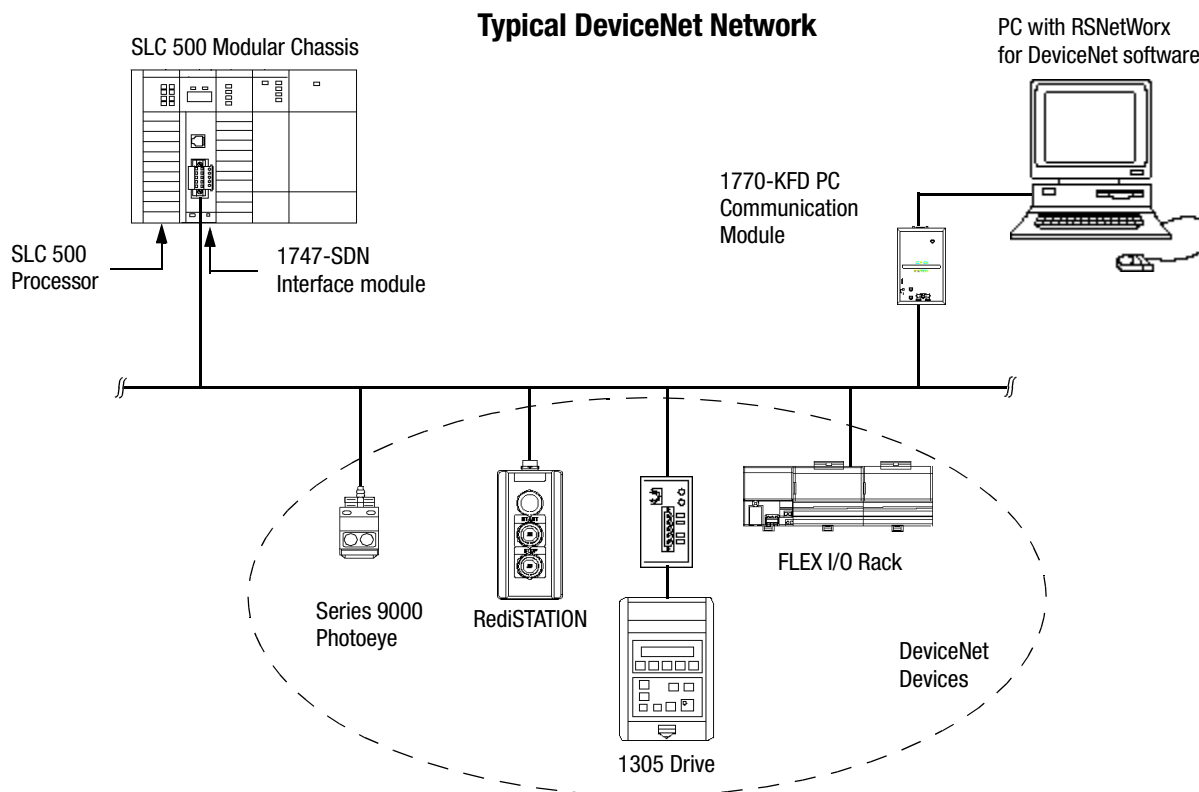
What You Need to Know

Before configuring your 1747-SDN module, you must understand:

- the data exchange between the an SLC 500 processor and DeviceNet devices through the 1747-SDN module
- user-configurable 1747-SDN module data tables
- the role of RSNetWorx for DeviceNet software

What Your 1747-SDN Module Does

In a typical configuration, the 1747-SDN module acts as an interface between DeviceNet devices and the SLC 500 processor.



The 1747-SDN module communicates with DeviceNet devices over the network to:

- read inputs from a device
- write outputs to a device
- download configuration data
- monitor a device's operational status

An M1/M0 file transfer is a method of moving large amounts of data between a SLC 500 processor and the 1747-SDN. It transfers files containing a maximum of 256 words and may take more than one SLC program scan to complete.

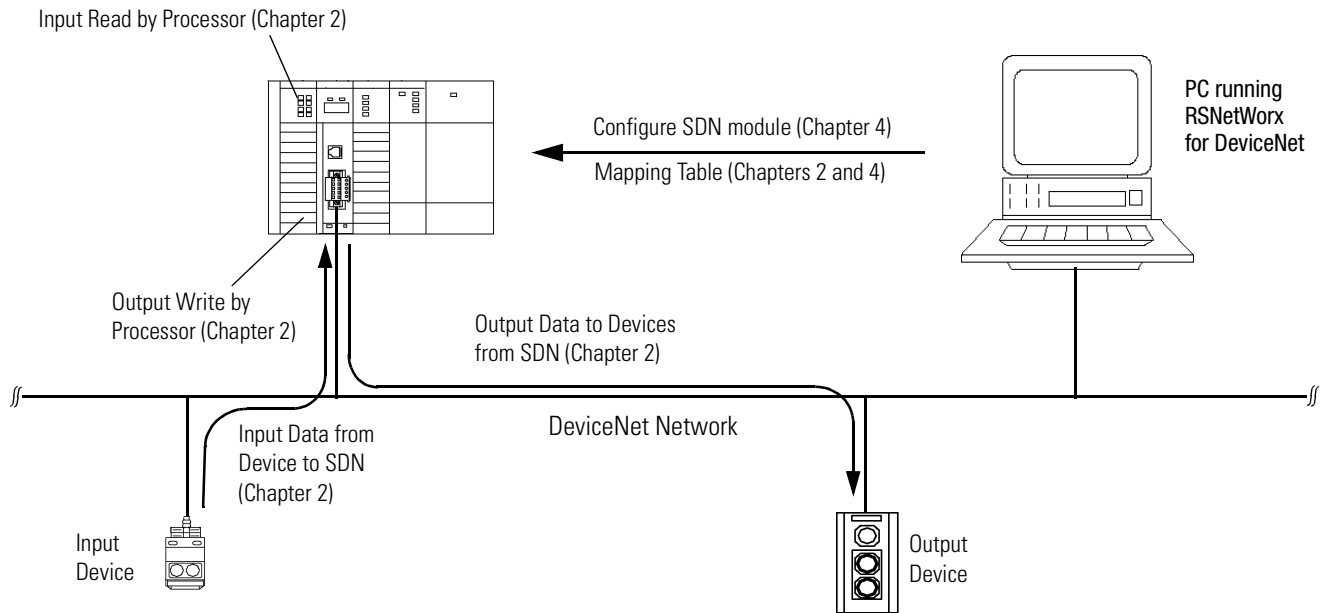
The 1747-SDN module communicates with the processor in the form of M1/M0 File Transfers and/or Discrete I/O (DIO). Information exchanged includes:

- device I/O data
- status information
- configuration data

Discrete input and output (DIO) is the transfer of 1 to 32 words between a SLC 500 processor and the 1747-SDN. All 32 words of input data and all 32 words of output data are updated on each SLC program scan.

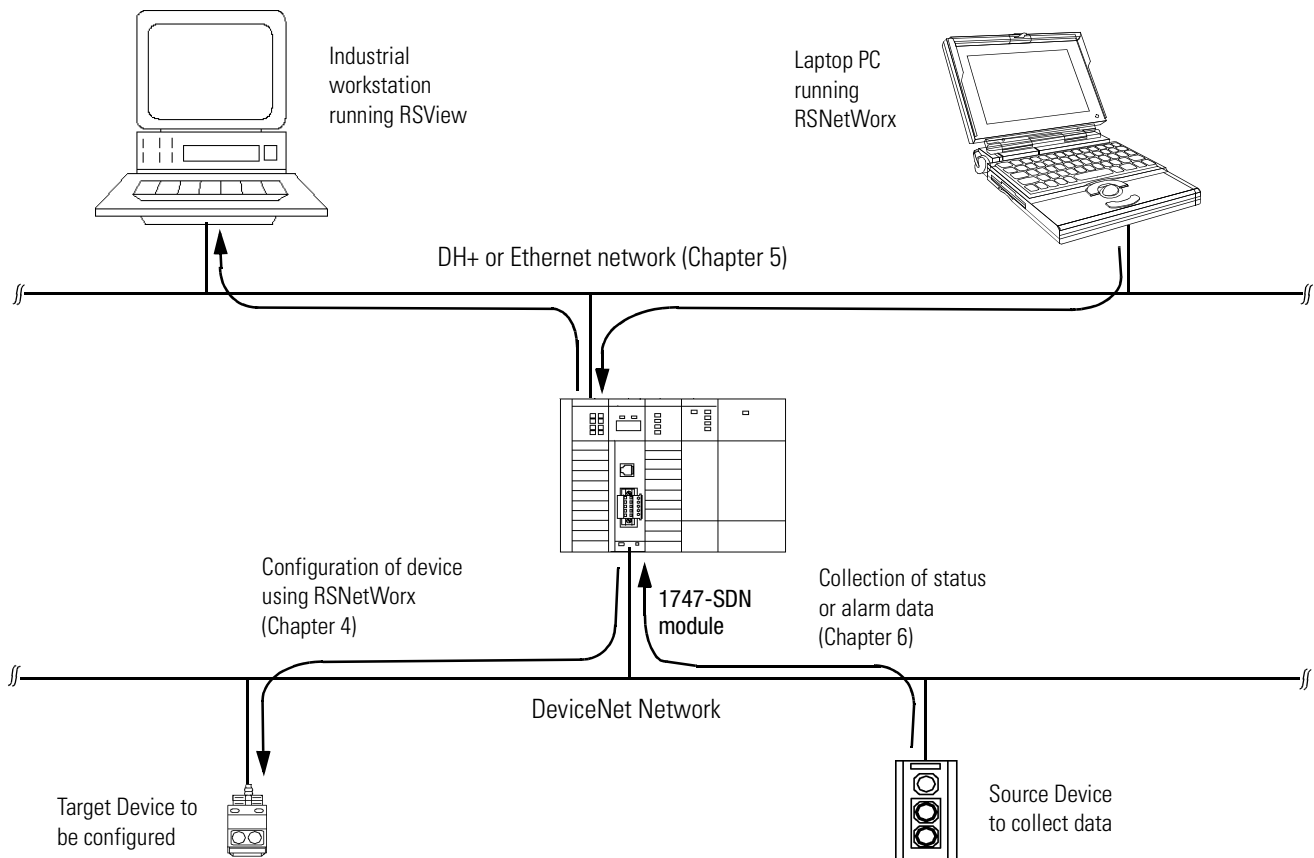
A processor to I/O DeviceNet configuration is shown in the following figure. See the referenced chapters for more information.

Processor to I/O



The 1747-SDN interface module can also be used to bridge a DeviceNet network with another network.

Configuring Devices and Data Collection on Higher-Level Networks Via SLC 500/SDN



Communicating with Your Devices

A strobe message is a multicast transfer of data (which is 64 bits in length) sent by the 1747-SDN module that solicits a response from each strobed slave device. There is one bit for each of the possible 64 node addresses. The devices respond with their data, which can be as much as 8 bytes.

A poll message is a point-to-point transfer of data (0-255 bytes) sent by the 1747-SDN module that solicits a response from a single device. The device responds with its input data (0-255 bytes).

A change of state message is a transfer of data sent whenever a data change occurs. A user-configurable heartbeat rate can also be set to allow devices to indicate proper operation during intervals between data changes. This does not solicit response data, but may receive an acknowledge message.

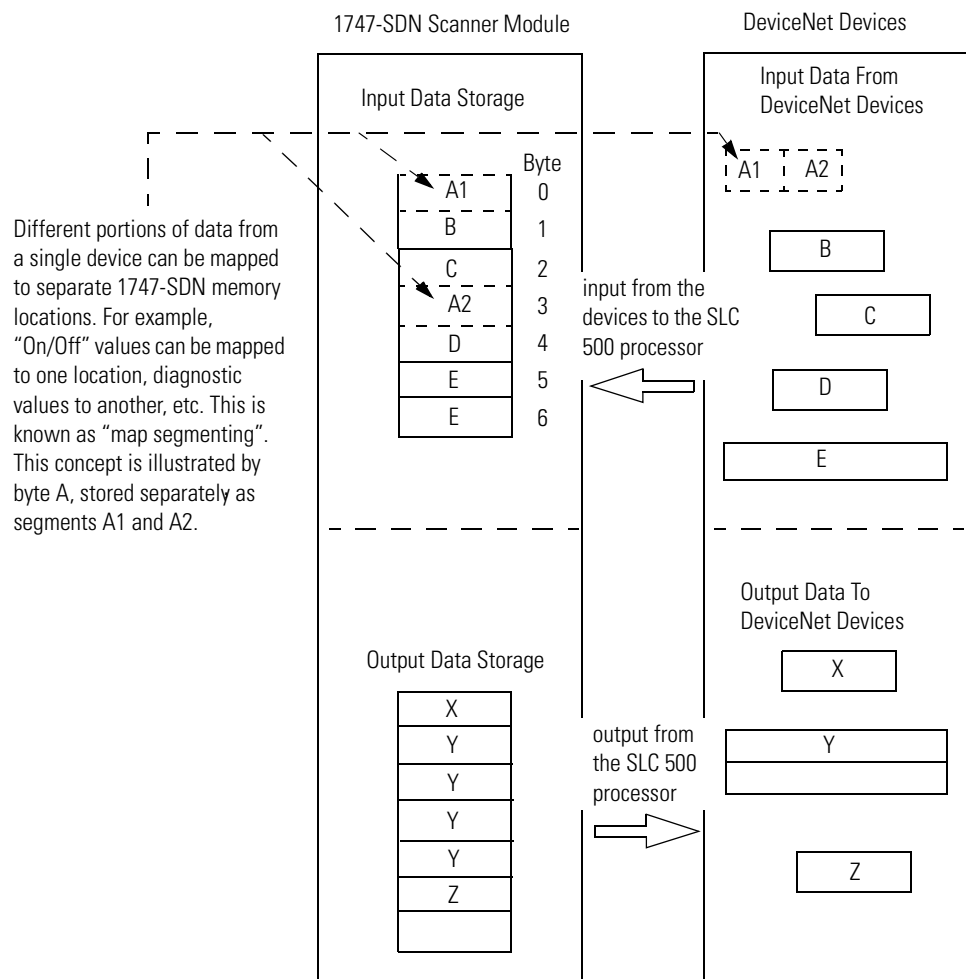
A cyclic message is sent only at a user-configurable rate, such as every 10 ms.

The 1747-SDN module communicates with a device via **strobe**, **poll**, **change of state**, and/or **cyclic** messages. It uses these messages to solicit data from or deliver data to each device. Data received from the devices, or input data, is organized by the 1747-SDN module and made available to the processor. Data received from your SLC 500 processor, or output data, is organized in the 1747-SDN module and sent on to your devices.

IMPORTANT

Throughout this document, *input* and *output* are defined from the SLC 500 processor's point of view. Output is data sent from the SLC 500 processor *to* a device. Input is data collected by the SLC 500 processor *from* a device.

All data sent and received on a DeviceNet network is in byte lengths. A device may, for example, produce only two bits of input information. Nevertheless, since the minimum data size on a DeviceNet network is one byte, two bits of information are included in the byte of data produced by the device. In this example (only two bits of input information), the upper six bits are insignificant.



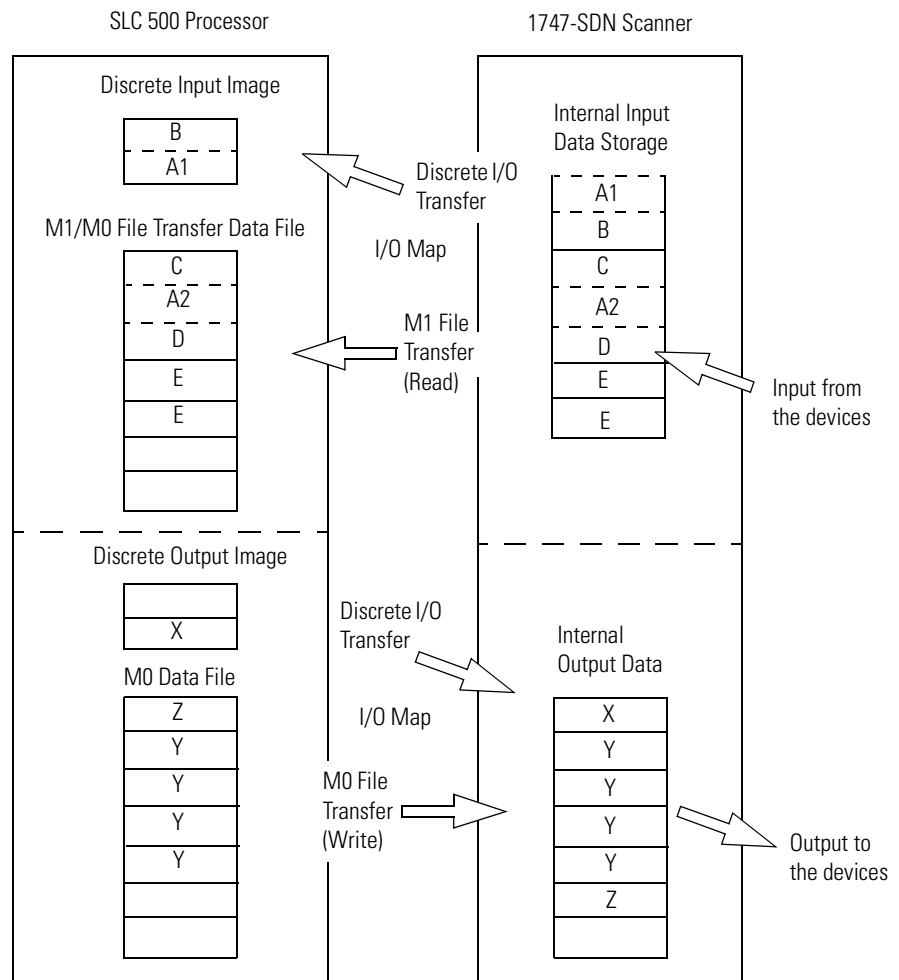
Communicating with Your SLC 500 Processor

An M1 file transfer is the transfer of data from the scanner to the processor. The scanner makes data collected from the network's devices available for the processor to "read", i.e., DeviceNet input data.

An M0 file transfer is the transfer of data from the SLC 500 processor to the scanner. The processor "writes" data to the scanner's memory, i.e., DeviceNet output data.

Your processor communicates with the 1747-SDN interface module via **M1 file transfer reads**, **M0 file transfer writes**, and **DIO** transfers. Input data, gathered from the network's devices, is organized within the 1747-SDN and made available for the processor to "read" from the M1 file.

The 1747-SDN module does not send data to your processor. Data transferred between the scanner module and the processor must be initiated by the processor. Output data is sent, or "written", to the scanner by your processor by placing the data in the M0 file. This data is organized in the scanner, which in turn passes the data on to the scanned devices via strobe, poll, change of state, or cyclic messages.



What 1747-SDN Module Data Tables Are and What They Do

To manage the flow of data between your SLC 500 processor and the network devices, the 1747-SDN module uses the following data tables:

- Scanner Configuration Table (SCT)
- Scanlist Table (SLT)
- Device Input Data Table
- Device Output Data Table
- Device Active Table
- Device Failure Table
- Client/Server Transaction Tables

You can configure the first two of these data tables through RSNetWorx for DeviceNet software:

- Scanner Configuration Table (SCT)
- Scanlist Table (SLT)

These two tables are stored in the 1747-SDN module's non-volatile memory and used to construct all other data tables.

The Scanner Configuration Table (SCT)

The SCT controls basic information your 1747-SDN module needs to function on your DeviceNet network. It tells your 1747-SDN module:

- if it can transmit and receive input and output data
- how long it waits after each scan before it scans the devices again
- when to send out its poll messages

The Scanlist Table (SLT)

The SLT supports I/O updating for each of your devices on the network. It also makes it possible for your 1747-SDN module to make device data available to your SLC processor. The SLT tells your 1747-SDN module:

- which device node addresses to scan
- how to scan each device (strobe, poll, change of state, cyclic or any valid combination)
- how often to scan your devices
- exactly where in each device's total data to find the desired data
- the size of the input data/output data
- exactly where to map the input or output data for your processor to read or write
- how your processor reads each device's input data (M1/M0 file or DIO)

Interscan delay is the time between I/O scans (polled and strobed). It is the time the 1747-SDN module will wait between the last poll message request and the start of the next scan cycle.

Background poll ratio sets the frequency of poll messages to a device in relation to the number of I/O scans. For example, if the ratio is set at 10, that device will be polled once every 10 scans.

User Configured Tables	Data In This Table	RSNetWorx Configuration Screen
SCT	<ul style="list-style-type: none"> • basic operation parameters • I/O communications data (enable/disable) • interscan delay • background poll ratio 	1747-SDN Module Configuration
SLT	<ul style="list-style-type: none"> • device-specific identification data 	Scanlist Editor (SLE)
	<ul style="list-style-type: none"> • data transfer method • transmit/receive data size 	Edit Device I/O Parameters
	<ul style="list-style-type: none"> • input and output data source and destination locations 	These values can be configured automatically through the AutoMap function or manually through the Data Table Map.

RSNetWorx Software as a Configuration Tool

RSNetWorx for DeviceNet software is used to configure the 1747-SDN module's data tables. This software tool connects to the 1747-SDN module over the DeviceNet network via a PC RS-232 interface (1770-KFD module) or PC Card (1784-PCD, -PCID, or -PCIDS).

TIP

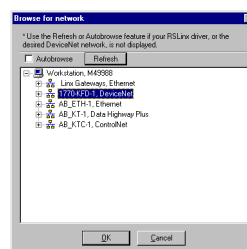
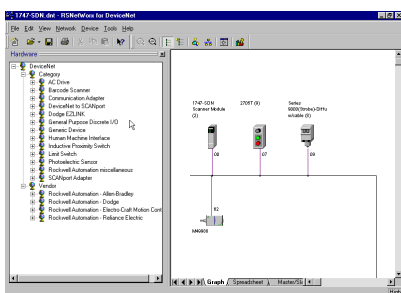


RSNetWorx for DeviceNet software can also communicate with the 1747-SDN module via an Ethernet or Data Highway Plus network. See chapter 5.

The configuration screen map below shows the RSNetWorx for DeviceNet screens used to configure the 1747-SDN module and the navigation paths between them. The use of these screens is described in Chapter 4.

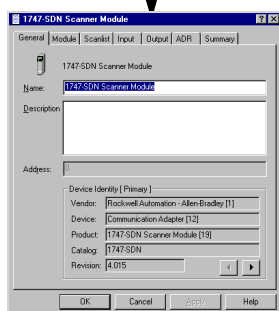
RSNetWorx for DeviceNet Configuration Screen Map

The main **RSNetWorx for DeviceNet** screen.

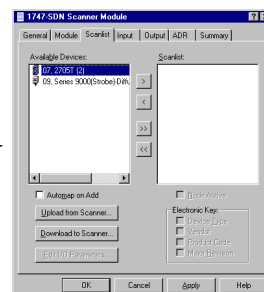


To browse the network, click on the **Online** button and select the driver.

To access the 1747-SDN Interface Module, double-click on the 1747-SDN icon.



To access the scanlist, click on the **Scanlist** tab.

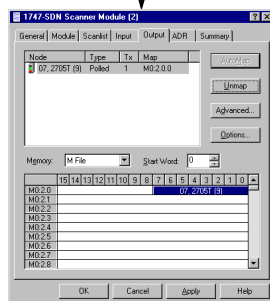
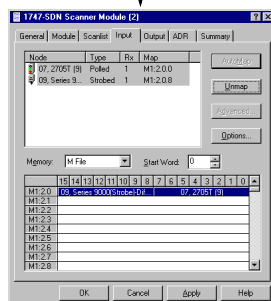


To download the scanlist, click on the **Download to Scanner** button.

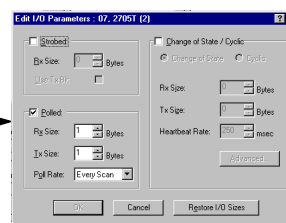


To automatically map input devices, select the **Input** tab and click on the **AutoMap** button.

To automatically map output devices, select the **Output** tab and click on the **AutoMap** button.



To edit a device's I/O parameters, double-click on the device in the scanlist.



What's Next?

The remaining sections of this manual provide the following information:

- Chapter 2 covers the configuration process planning stage through a data mapping example.
- Chapter 3 describes the hardware setup for the example application.
- Chapter 4 covers configuration of the DeviceNet network using RSNetWorx for DeviceNet software.
- Chapter 5 describes how to configure a DeviceNet network from another network.
- Chapter 6 describes how to create, download, and run the example application program.
- Chapter 7 covers the diagnostics provided for troubleshooting the 1747-SDN module.

Planning Your Configuration and Data Mapping Your Devices

What This Chapter Contains

This chapter introduces questions you should ask before configuring your 1747-SDN communication module. In addition, it presents an example DeviceNet network and I/O data mapping scheme for a photoeye and a RediSTATION operator interface module. The following table identifies what this chapter covers and where to find specific information.

For information about	See page
What You Need to Know	2-1
Beginning the Process	2-1
The Example Network	2-2
Example Network Devices	2-2
RediSTATION Input and Output Data Mapping	2-4
Mapping RediSTATION Input Data for an M1 File Data Table Read	2-5
Mapping RediSTATION Output Data for an M0 File Data Table Write	2-6
Photoeye Input Data Mapping	2-7
Mapping Photoeye Input Data for an M1 File Data Table Read	2-8

What You Need to Know

To map data via your 1747-SDN communication module, you must understand:

- your network requirements
- how input data is mapped
- how output data is mapped

Beginning the Process

Planning before configuring your 1747-SDN module helps make sure that you can:

- use your memory and bandwidth efficiently
- cater to device-specific needs and requirements
- give priority to critical I/O transfers
- leave room for expansion

A very important question to answer is “what is on your network?” You should be familiar with each device’s:

- communication requirements
- I/O importance and size
- frequency of message delivery

You should also ask “how might this network appear in the future?” At this point in your planning, it is advantageous for you to have some idea of how the network could be expanded. I/O data mapping can be performed automatically by the RSNetWorx software. But when mapping your I/O, you also have the opportunity to allot room for future I/O. This can save time and effort in the future.

For example, RSNetWorx will automatically map the devices as efficiently as possible, but the result is that multiple devices may share the same word location in memory. However, you can also have the system map the devices such that no two devices share the same memory location by selecting the “Dword align” option when performing automapping. You can also manually map the devices if you need to assign or reassign them to specific memory locations.

For details refer to the Help screens provided by the RSNetWorx for DeviceNet software. Additional support can be found at the Rockwell Software website: <http://www.software.rockwell.com>.

The Example Network

The following example illustrates a data mapping plan for a DeviceNet network. Note that even if the mapping is performed automatically by the RSNetWorx software, you must know where the devices are mapped in order to use them in your network.

Example Network Devices

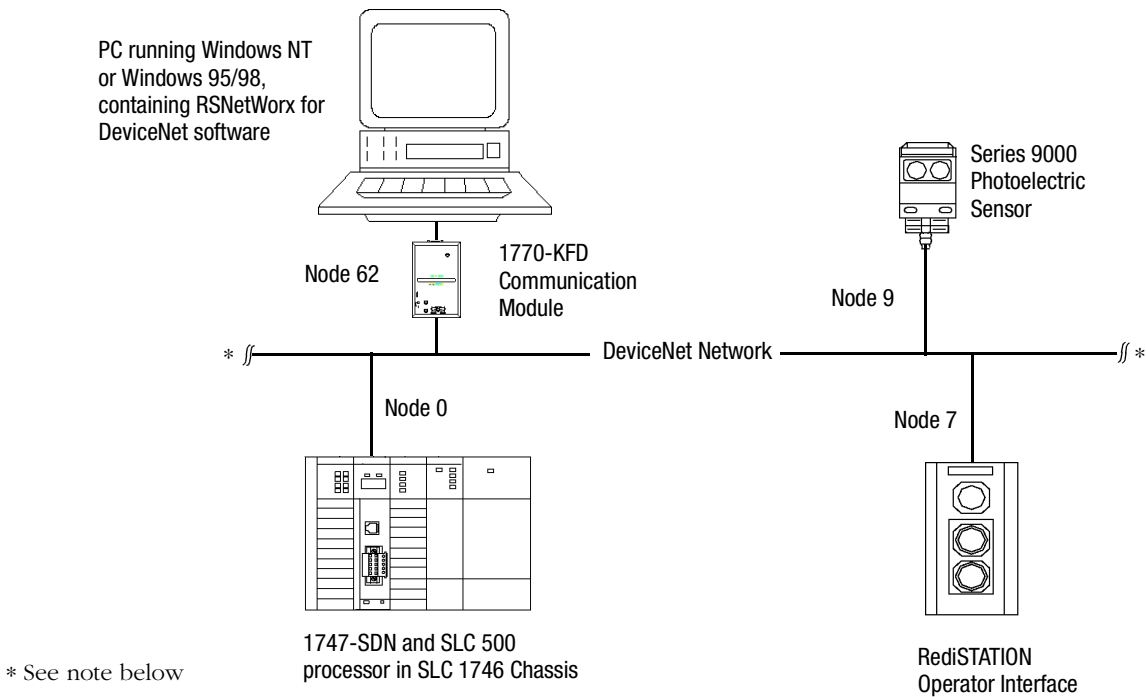
This example network has the following devices:

- a PC running RSNetWorx for DeviceNet software
- a 1747-SDN communication module interfacing a SLC 500 processor with DeviceNet
- a Series 9000 photoelectric sensor (strobed)
- a RediSTATION operator interface (polled)

IMPORTANT

In the following example, output is data sent *to* a device from a controller. Input is data collected *from* a device by a controller.

The system you will set up is shown below:



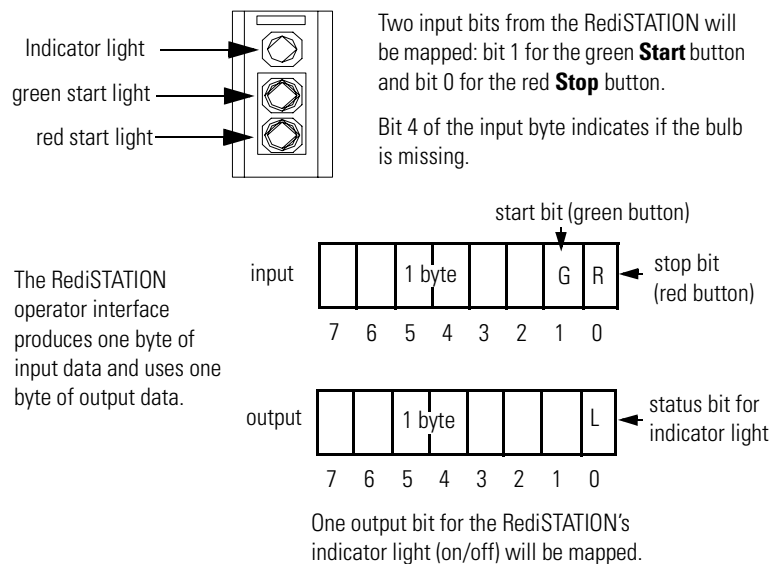
IMPORTANT Each end of the DeviceNet trunk cable must be properly terminated with a resistor. Refer to the DeviceNet Cable Planning and Installation Manual, publication DN-6.7.2 for detailed information.

RediSTATION Input and Output Data Mapping

The RediSTATION has both inputs and outputs that must be mapped. The input byte is mapped to the 1747-SDN module's M1 file and then to the SLC 500 processor's input data file. The output byte is mapped to the 1747-SDN module's M0 file and then to the SLC 500 processor's output data file.

The mapping procedure, using RSNetWorx for DeviceNet software, is described on pages 4-12 to 4-15.

RediSTATION operator interface



In the RediSTATION's bits for the red and green buttons and the indicator light status bit:

- 1 = ON
- 0 = OFF

The following is an example of input data mapping for the RediSTATION.

- | | |
|--------|-----------------------------|
| N7:0 | 0000 0000 0000 00 GR |
| N7:1 | 0000 0000 0000 0000 |
| N7:2 | 0000 0000 0000 0000 |
| N7:3 | 0000 0000 0000 0000 |
| N7:4 | 0000 0000 0000 0000 |
| <hr/> | |
| N7:149 | 0000 0000 0000 0000 |

Diagram illustrating the structure of a 64-bit word (Word 0) and its continuation up to Word 61. The word is composed of 16 bytes (8 bits each). The first 14 bytes are labeled 'G' and the last 2 bytes are labeled 'R'. The diagram shows the first five words (Word 0 to Word 4) and indicates that the structure continues up to Word 61.

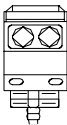
The red STOP button from the RediSTATION appears in the SLC 500 processor's input file at address N7:0/0.

Photoeye Input Data Mapping

The photoelectric sensor (photoeye) inputs are mapped to the 1747-SDN module's M1 file and then to the SLC 500 processor's input data file. The procedure for doing this using RSNetWorx for DeviceNet software is described on pages 4-12 to 4-15.

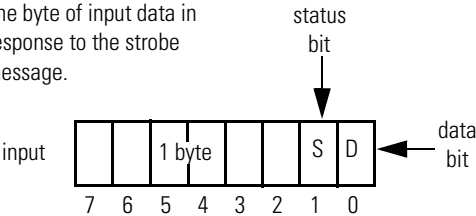
The photoeye has no outputs to map.

Series 9000 Photoeye



Two input bits from the photoeye will be mapped: the status bit and the data bit.

The photoeye produces one byte of input data in response to the strobe message.



Mapping Photoeye Input Data for an M1 File Data Table Read

What's Happening?

1

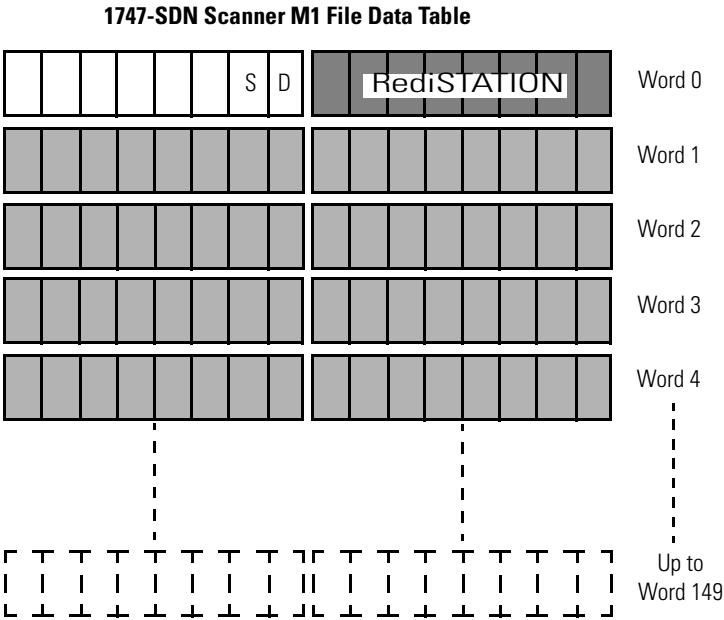
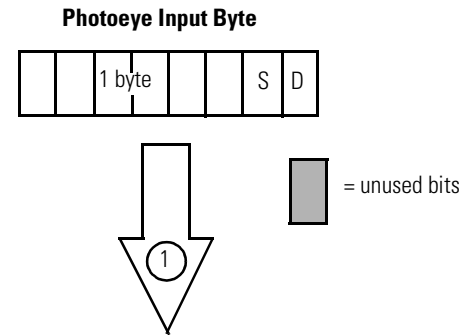
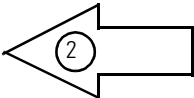
The status and data bits from the photoeye are mapped into the 1747-SDN Scanner's M1 file data table.

2

The M1 file data table is then transferred to the SLC 500 processor's input data file.

Important: The 1747-SDN module only makes the data available for the processor to read. The 1747-SDN module does not move the data to the processor.

SLC 500 Processor Input Data File ¹	
N7:0	0000 00SD 0000 0000
N7:1	0000 0000 0000 0000
N7:2	0000 0000 0000 0000
N7:3	0000 0000 0000 0000
N7:4	0000 0000 0000 0000
⋮	
N7:149	0000 0000 0000 0000



¹ This mapping is based upon the examples in chapters 4 and 6. The actual mapping for your system may be different.

Example: The Status bit from the photoeye appears in the SLC 500 processor's input data file at address N7:0/9. The Data bit from the photoeye appears in the SLC 500 processor's input data file at address N7:0/8.

What's Next?

Chapter 3 describes how to set up the system hardware for the example application.

Hardware Setup

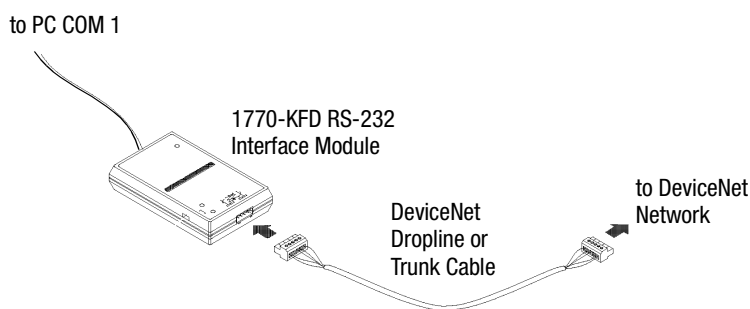
What This Chapter Contains

This chapter describes how to set up the hardware for the example application. The following table describes what this chapter contains and where to find specific information.

For information about	See page
Installing the 1770-KFD Module	3-1
Installing the SLC 500 Processor	3-2
Installing the ControlNet RS-232 Interface Module	3-5
Installing the 1747-SDN Scanner Module	3-9
Installing the RediSTATION Operator Interface	3-13
Installing the Series 9000 Photoeye	3-14
How Your Network Will Look	3-15

Installing the 1770-KFD Module

Connect the RS-232 connector on the 1770-KFD communications interface module to one of the serial ports on your PC workstation (e.g., COM1). Connect the DeviceNet connector on the 1770-KFD module to a DeviceNet drop or trunk cable. You can make this connection in several ways; for example, using a DeviceNet Quad Tap (part no. 1492-DN3TW) as shown on page 3-15.

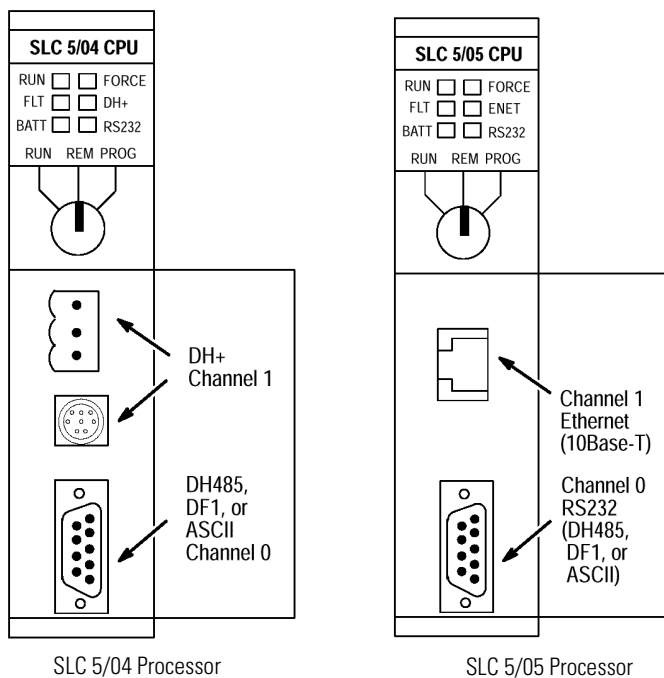


For detailed directions on how to install the 1770-KFD module, see the DeviceNet RS-232 Interface Module Installation Instructions, publication 1770-5.6.

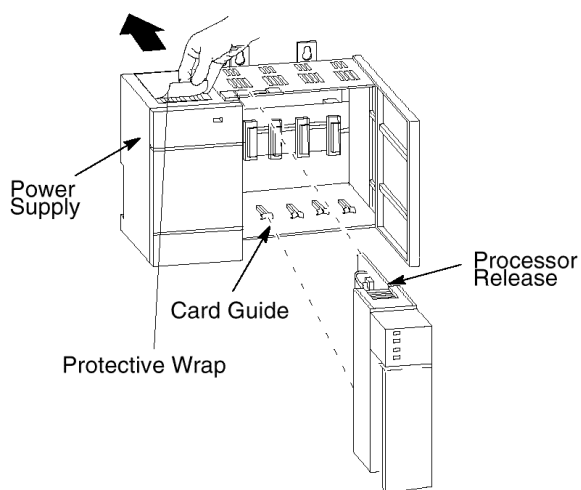
Installing the SLC 500 Processor

Identifying Processor Features

Refer to the following figures to identify the features of your SLC 5/04 or SLC 5/05 processor.



Make sure system power is off; then insert the processor into slot 0 of the 1746 I/O chassis.



IMPORTANT

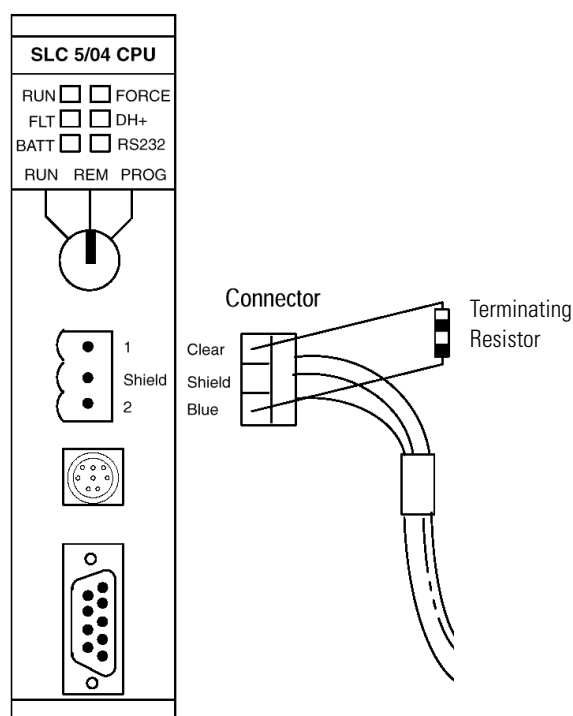
Insert the SLC 500 processor into the left slot (slot 0), as shown above. Remove the protective wrap after installing the processor.

Establishing Data Highway Plus Communications

For the examples using Data Highway Plus (DH+) in chapters 5 and 6 of this manual we installed a 1784-KTX communications card in the host platform (see Appendix G) and a SLC 5/04 processor with the default Channel 1 DH+ configurations listed below:

- DH+ Node Address = 1
- Baud Rate = 57.6K

Connect Channel 1 of the SLC 5/04 processor to the DH+ network using the 3-pin connector on the front of the module.

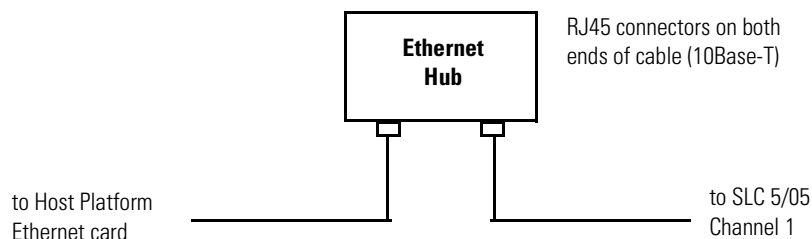


See Chapter 5 and Appendix D for information on configuring the SLC 5/04 processor's DH+ communications.

Installing an Ethernet SLC 500 Processor (SLC 5/05)

In order to communicate with your SLC 500 processor over an Ethernet network, you must install an Ethernet version of the processor (SLC 5/05, catalog numbers 1747-L551, 1747-L552, or 1747-L553).

Connect channel 1 of the Ethernet SLC 5/05 processor to an Ethernet hub using 10 Base-T cable as shown below.



See Chapter 5 and Appendix E for information on configuring the SLC 5/05 processor's Ethernet communications.

Configuring the RS-232 Port for the ControlNet Interface

If you need to communicate with your SLC 500 via a ControlNet network you must install a 1747-KFC15 ControlNet Interface module in the chassis with your processor. You can use either a 5/04 or a 5/05 processor. The 1747-KFC15 module connects to the SLC 500 via the processor's RS-232 port (channel 0).

TIP

You can use your RSLogix 500 programming software to set the SLC 5/04 processor's RS-232 channel configuration. See Appendix C.



Installing the ControlNet RS-232 Interface Module

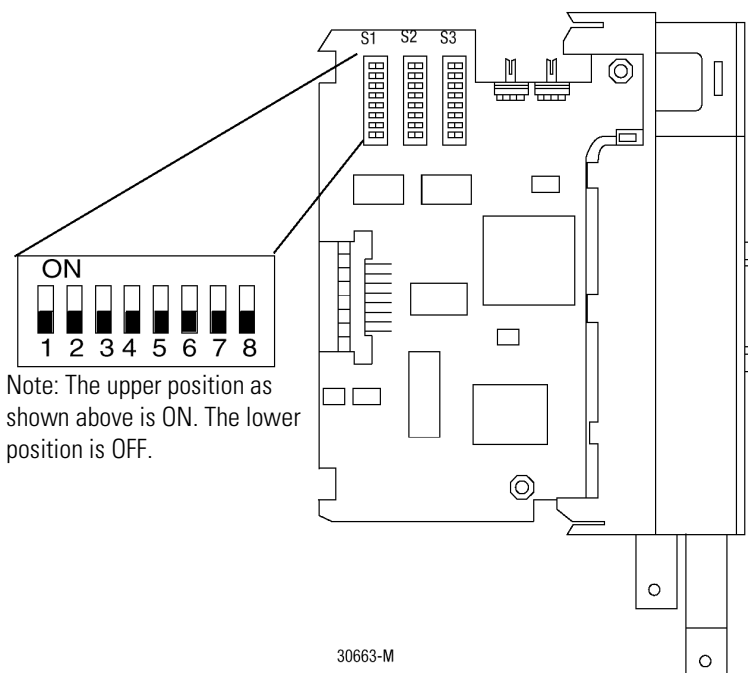
To communicate with the SLC 500 processor via a ControlNet network you must install a 1747-KFC15 ControlNet RS-232 Interface module in the 1746 I/O chassis close to the processor.

Configuring the 1747-KFC15 Module's RS-232 Port

IMPORTANT

The communication parameters of 1747-KFC15 module must match those of the SLC 500 processor.

The RS-232 serial port on the 1747-KFC15 module is configured using three banks (S1, S2, and S3) of DIP switches mounted on the module's printed circuit board.



For the example application, we used the following configuration to match the configuration of the SLC 500 processor's RS-232 port described in the previous section:

Channel 0 Configuration			
DF1 Station Address: 0		Diagnostic Command Execution:	Disabled
Baud Rate:	19200	Duplicate Detect:	Enabled
Full/Half Duplex:	Full Duplex	Error Detect:	CRC
Parity:	NONE	Retries:	3
Handshake:	No Handshaking	DF1 ACK Timeout:	1.0 sec.

For this configuration, set the switches as shown in the tables below.

Bank S1 DIP Switches

Switches 1-3	Upper digit of DF1 station address	SW 1	SW 2	SW 3	Digit
		ON	ON	ON	0
Switches 4-6	Lower digit of DF1 station address	SW 4	SW 5	SW 6	Digit
		ON	ON	ON	0
Switches 7-8		both OFF			

Bank S2 DIP Switches

Switches 1-3	Serial Port Baud Rate	SW 1	SW 2	SW 3	Baud Rate
		ON	OFF	OFF	19200
Switch 4	Full/Half Duplex	OFF = Full Duplex			
Switch 5	Parity	OFF = No Parity			
Switch 6	Odd/Even Parity	not applicable			
Switch 7	Handshake	OFF = Hardware handshake disabled			
Switch 8	Diagnostic Command Execution	OFF = Disabled			

Bank S3 DIP Switches

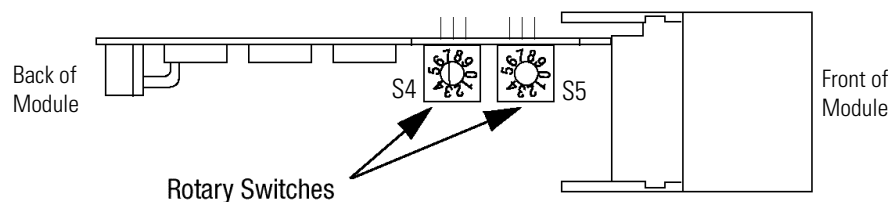
Switch 1	Duplicate Detect	ON = Duplicate detect on				
Switch 2	Error Detect	OFF = CRC error check				
Switches 3-4	Number of Retries	SW 3	SW 4	Number of retries		
		ON	ON	0		
Switches 5-8	DF1 ACK Time-out	SW 5	SW 6	SW 7	SW 8	Time Out
		OFF	OFF	OFF	OFF	3.2



Refer to the SLC 500 ControlNet RS-232 Interface User Manual, publication 1747-5.34, for information on setting and verifying the 1747-KFC15 and SLC 500 processor communication parameters.

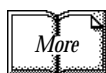
Configuring the 1747-KFC15 Module's ControlNet Node Address

The 1747-KFC15's ControlNet node address is set by rotary switches S4 and S5 on the top of the module. Switch S5 sets the upper digit of the address and S4 the lower. These switches can be turned by hand while holding the module in the orientation illustrated below.



We set the ControlNet node address to 16 for the example application.

ControlNet node address = 16



Refer to Chapter 5 and Appendix B for more information on configuring ControlNet communications for the example application.

Installing the 1747-KFC15 Module in the Chassis

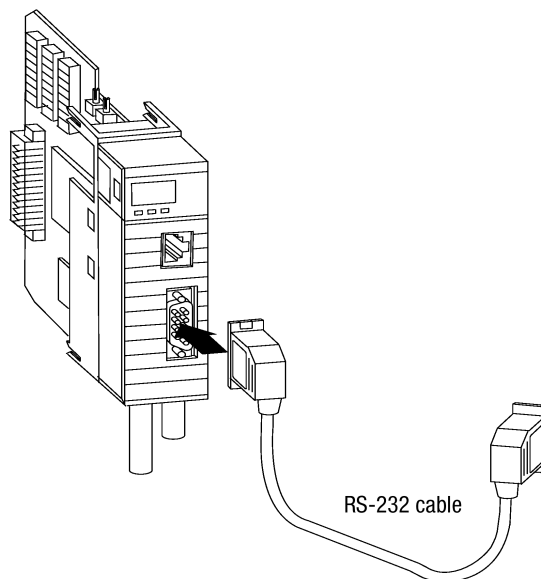
ATTENTION



Electrostatic discharge can damage semiconductor devices inside the KFC15 module. To guard against electrostatic damage wear an approved wrist strap grounding device, or touch a grounded object to rid yourself of electrostatic charge before handling the products.

1. Remove power from your 1746 I/O chassis.
2. Install the 1747-KFC15 module into an empty I/O slot. The 1747-KFC15 module must be placed near enough to the SLC processor to connect the supplied RS-232 cable between them. We used slot 1 for the example application.

3. Connect the 1747-KFC15 module to your SLC 500 processor with the RS-232 cable.



Connecting the 1747-KFC15 Module to the ControlNet Network

Connect the 1747-KFC15 to the ControlNet cable system using an approved ControlNet tap.

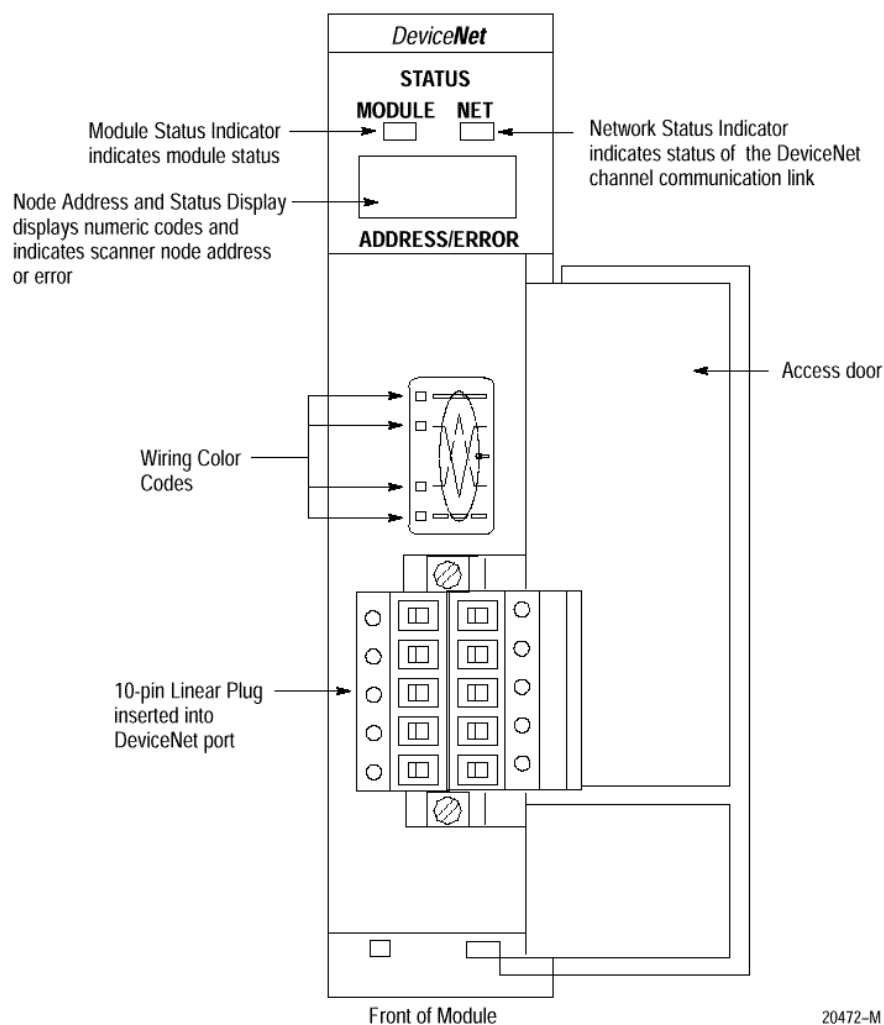


Refer to the ControlNet Cable System Planning and Installation Manual (pub. no. 1786-6.2.1) for complete instructions on connecting the tap to the ControlNet cable system.

Installing the 1747-SDN Scanner Module

Identifying Module Features

Use the following figure to identify the features of the 1747-SDN/B scanner module.



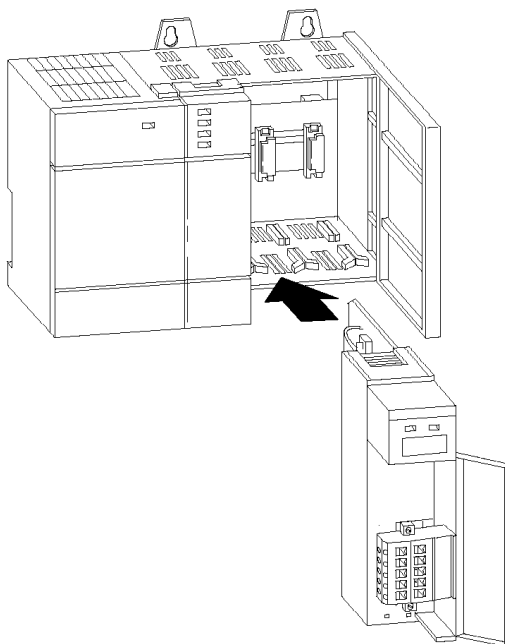
Installing the 1747-SDN Module In the Chassis

ATTENTION

Do not install the 1747-SDN Scanner Module with the chassis power supply on. Installing the module with the chassis power supply on may damage the module.

To install your module into the chassis:

1. Turn off the chassis power supply.
2. Select a slot for the module in the chassis. You may use any slot except the leftmost slot, which is reserved for the SLC 500 processor.
3. Insert the module into the slot you have selected. Apply firm, even pressure to seat the module in the chassis backplane connectors.



Connecting the 1747-SDN Module to the DeviceNet Network

To connect your module to the DeviceNet network:

1. Turn off the network power supply.

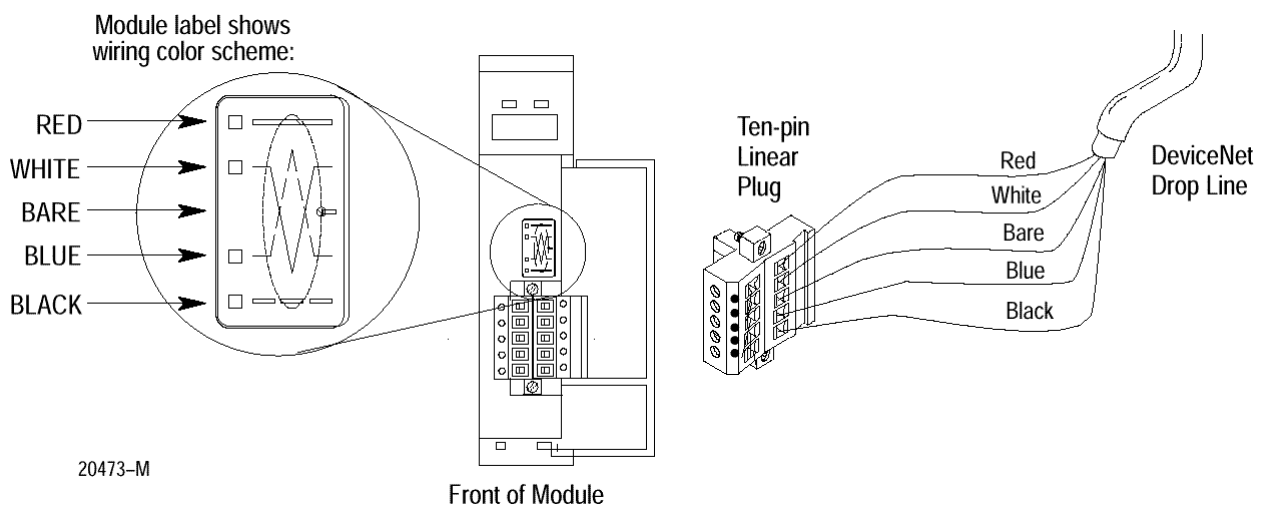
ATTENTION



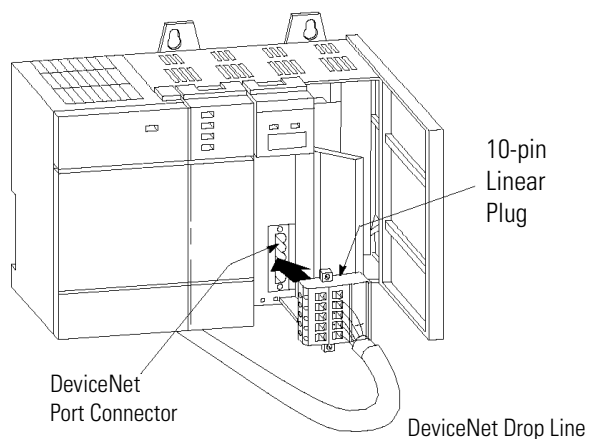
Do not wire the 1747-SDN Scanner Module with the network power supply on. Wiring the module with the network power supply on may short your network or disrupt communication.

2. Connect the DeviceNet drop line to the 10-pin linear plug.

Match the wire insulation colors to the colors shown on the label as shown below:



3. Locate the DeviceNet Port connector on the front of the module, and insert the 10-pin linear plug into the connector.



TIP



You use RSNetWorx for DeviceNet software to configure the scanner module's DeviceNet address and baud rate, if needed. This is done when configuring the DeviceNet network (see pages 4-6 to 4-8).



For additional information about installing the 1747-SDN module, see the 1747-SDN DeviceNet Scanner Module Installation Instructions, publication 1747-5.8.

Installing the RediSTATION Operator Interface

Begin installing the RediSTATION by removing the six screws fastening the cover and setting the DIP switches inside as follows:

Set this position	To this value:		
1	1	On	(node address ¹)
2	1	On	
3	1	On	
4	0	Off	
5	0	Off	
6	0	Off	
7	0	Off	(data rate ²)
8	1	On	
9	0	Off	
10	0	Off	

¹The DeviceNet address is 000111 (node 7).

²The data rate is 10 (500 kb).

The output fault rate is 0 (outputs turned off).

The output flash rate is 0 (outputs tuned off).



See Chapter 2 of the RediSTATION Operator Interface User Manual, publication 2705-804, for complete information about setting the DIP switches to configure the node address, data rate, output flash rate, and output fault state.

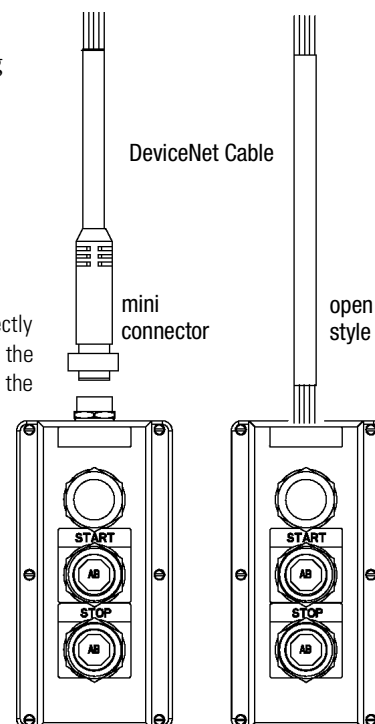
Refer to the following illustration as you connect the RediSTATION to the network.

TIP



You do not need to disconnect incoming power from the DeviceNet network before connecting the RediSTATION.

The DeviceNet cable connects directly to the mini connector on the top of the RediSTATION enclosure or through the conduit opening (open style).

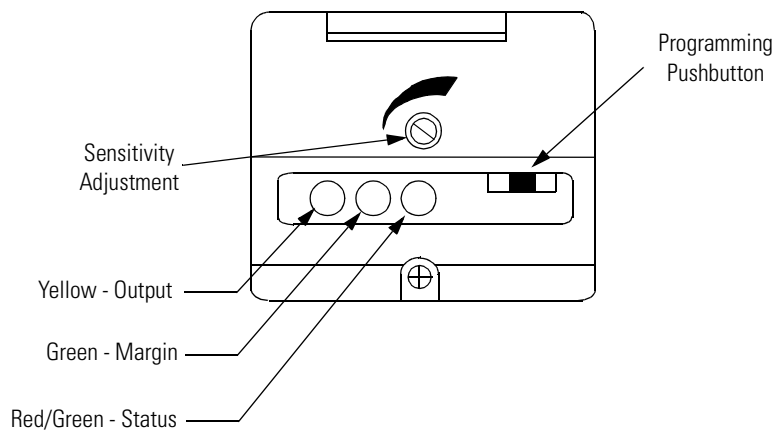


Installing the Series 9000 Photoeye

Connect the photoeye to the network and configure the photoeye as follows:

- Node Address: 9
- Operating Mode: Light Operate (default)
- Baud Rate: 500 kb

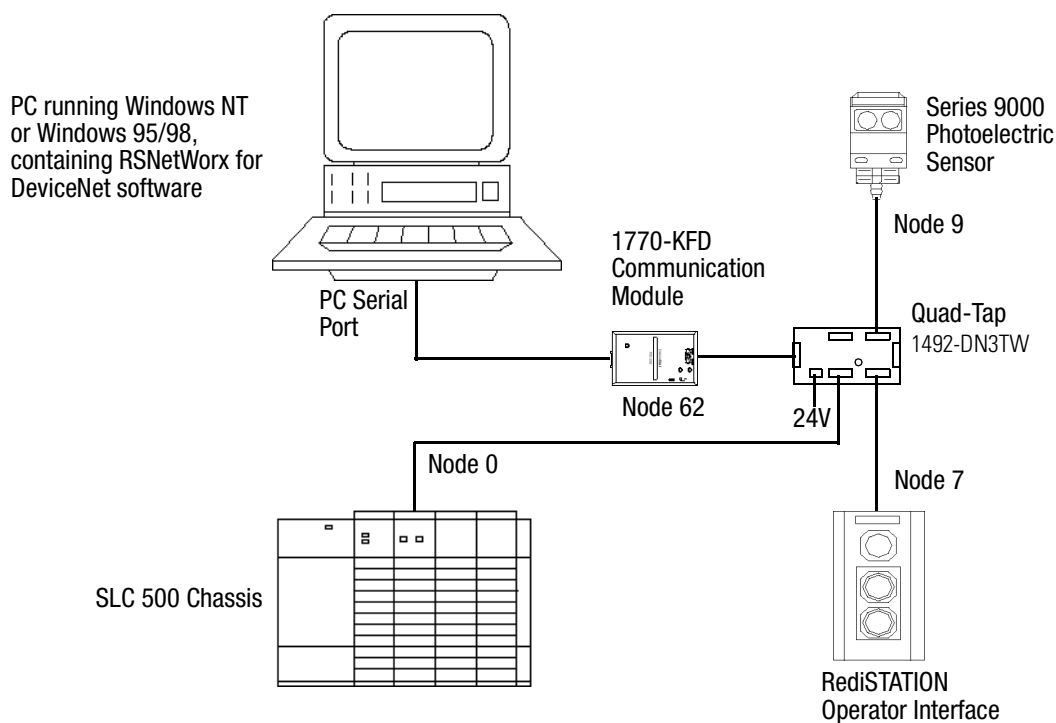
Top View of Series 9000 Photoeye



For detailed directions, see the instructions that came with your photoeye.

How Your Network Will Look

When you have finished installing all the devices, the network should look similar to this:



IMPORTANT

Make sure **each end** of the DeviceNet trunk cable is properly terminated with a resistor. Refer to the DeviceNet Cable Planning and Installation Manual, publication DN-6.7.2 for information.

What's Next?

The next step is to configure the 1747-SDN module and perform I/O data mapping through RSNetWorx for DeviceNet software.

Configuring the DeviceNet Network

What This Chapter Contains This chapter describes how to configure the DeviceNet network using RSLinx and RSNetWorx for DeviceNet software. The following table describes what this chapter contains and where to find specific information.

For information about	See page
Installing the Software	4-1
Using RSLinx to Configure the DeviceNet Driver	4-2
Using RSNetWorx to Configure the 1747-SDN Module Scanlist	4-4
Setting Up an Online Connection	4-4
Setting the 1747-SDN Node Address	4-6
Configuring the I/O Devices	4-9
Verifying the Photoeye Configuration	4-11
Verifying the RediSTATION Configuration	4-11
AutoMapping the Devices into the Scanlist	4-12
Download and Save Your Configuration	4-15

Installing the Software

Install the **RSLinx** and **RSNetWorx for DeviceNet** software.

For both of the software packages:

1. Insert the software CD-ROM in the drive.

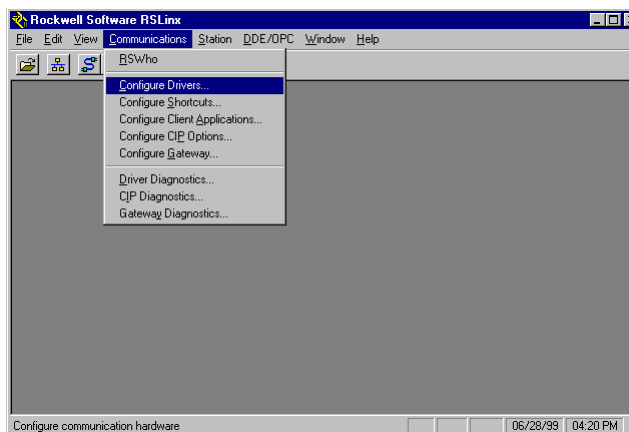
The CD-ROM supports Windows Autorun. If you have Autorun configured, the installation will automatically start when you insert the CD-ROM in your drive. If you do not have Autorun configured, perform steps 2 and 3.

2. From the Windows **Start** menu, select **Run**.
3. Browse for the **Setup** program on the CD ROM and open it.
4. Follow the prompts that appear on the screen as you install the software.

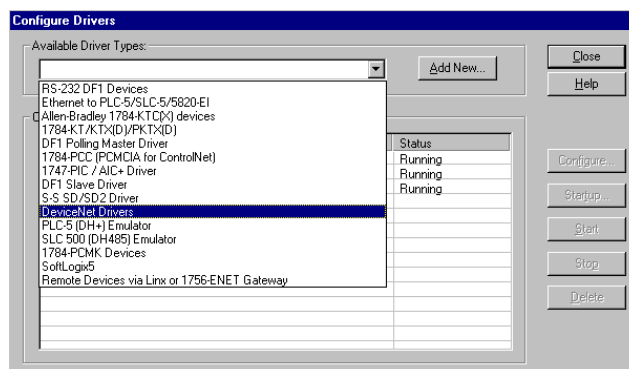
After software installation is complete, you will use RSLinx to configure your DeviceNet driver and RSNetWorx for DeviceNet to configure the network.

Using RSLinx to Configure the DeviceNet Driver

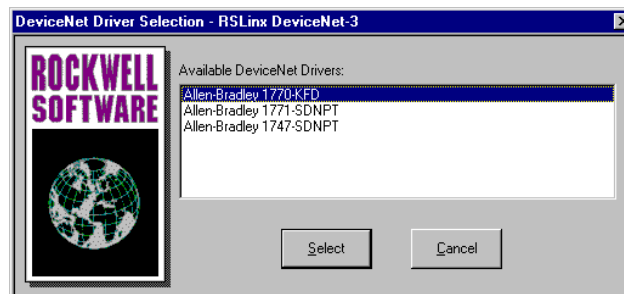
1. Start **RSLinx**. The RSLinx main window will open.



2. From the **Communications** menu, select **Configure Drivers** as shown above. The following window will appear.



3. Select **DeviceNet Drivers** from the above pull-down list and click on **Add/New**. You will see the following choices.

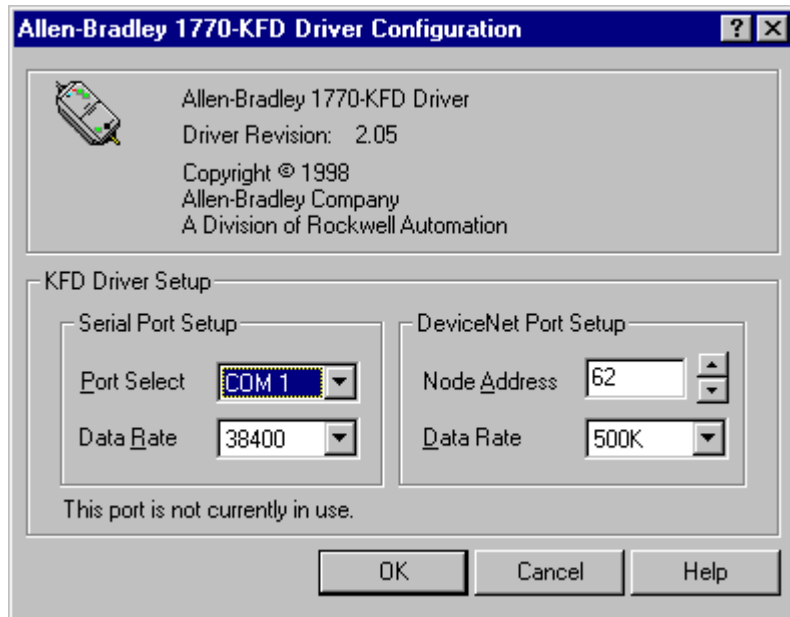


4. Select the **Allen-Bradley 1770-KFD** driver.

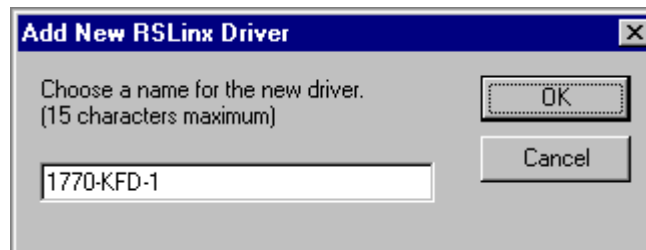
TIP

Your driver setup will depend on your particular system setup (COM port, baud rate, node address). Choose the appropriate settings for your system. We used the settings shown at right.

The Driver Configuration window will appear.



5. Configure the driver using the example above as a guide and click on **OK**. The software will take a few seconds to configure the driver. When it is done the following prompt will appear:



6. Select the default driver name **1770-KFD-1** and click on **OK**.
7. Close RSLinx.

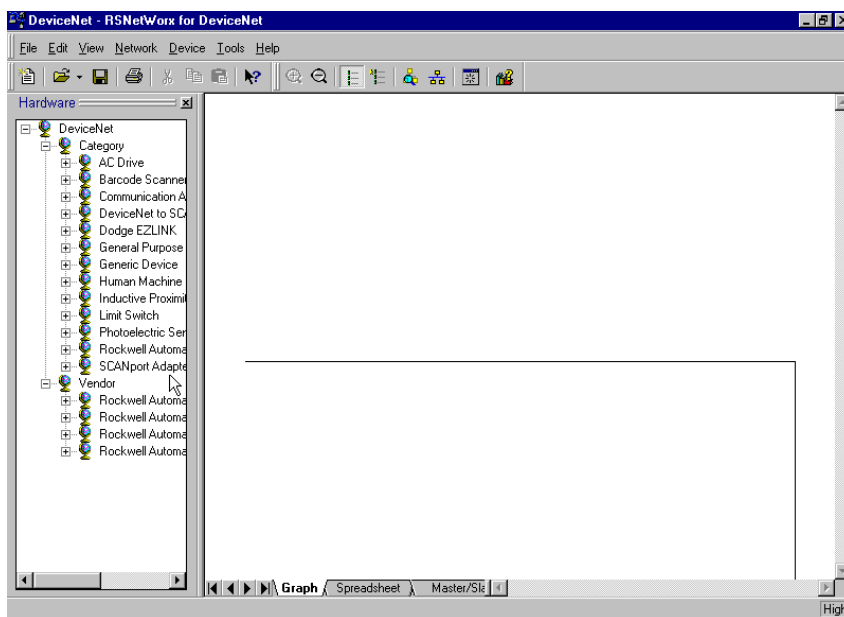
You will use the driver you just configured to browse and configure the network with RSNetWorx for DeviceNet.

Using RSNetWorx to Configure the 1747-SDN Module Scanlist

Setting Up an Online Connection

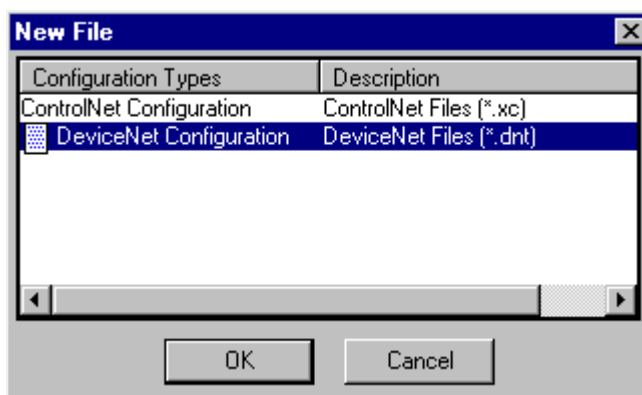
Follow the procedure below to set up an online connection to the DeviceNet network using the 1770-KFD driver.

1. Start **RSNetWorx for DeviceNet**. The following screen will open.



2. From the **File** menu, select **New**.

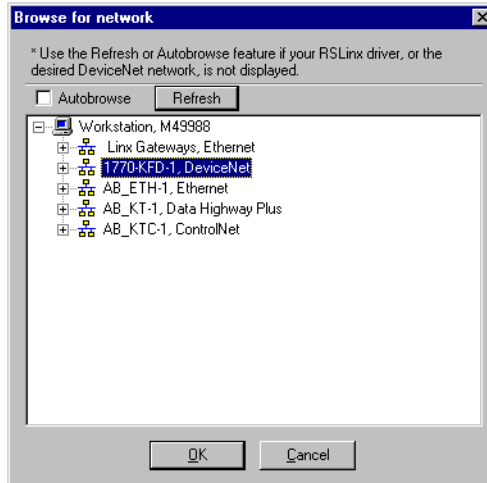
If you have ControlNet configured on your system you may see the following window. Otherwise, proceed to step 4.



3. Highlight **DeviceNet Configuration** and click on **OK**.

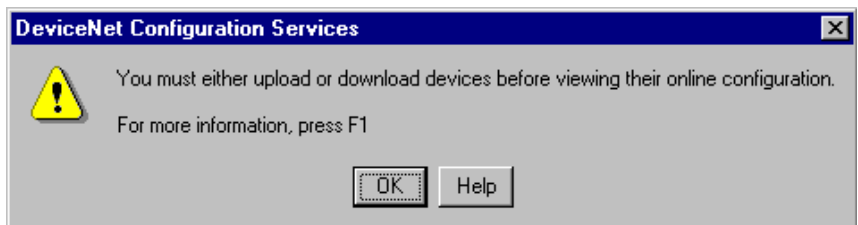
4. Click on the **Online** button  on the toolbar.

A list of the available drivers in RSLinx will appear. (Your list may appear different from that shown below, depending upon the drivers you have configured on your system.)



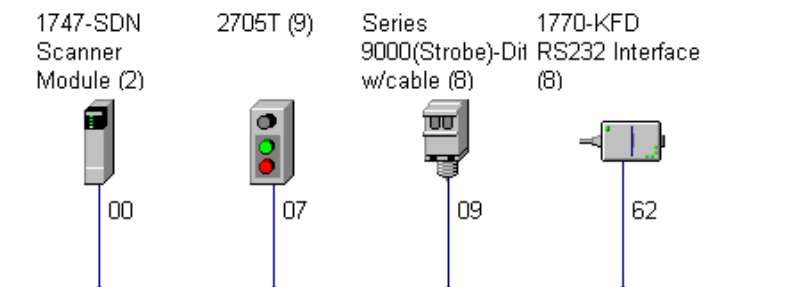
5. Select the **1770-KFD-1, DeviceNet** driver and click on **OK**.

You will be prompted to upload or download devices before going online.




6. Click on **OK** to upload the devices and go online.

RSNetWorx for DeviceNet will begin browsing for network devices. When the software is done browsing, the network displayed on your screen should appear similar to the one shown below.



TIP

RSNetWorx for DeviceNet performs a one-shot browse when you go online or choose the browse feature. The software will poll for devices one time and display the results. If a node which was online later goes offline, there will be no “live” indication in RSNetWorx. You must manually perform a browse to detect the missing node.

To manually perform the browse, press the  button.

TIP

If RSNetWorx fails to find a device, check the physical connection to the device. If the physical connection is intact, verify that the device’s baud rate is the same as the 1770-KFD driver’s.

Setting the 1747-SDN Node Address

Once the devices are uploaded, their node addresses appear to the right of their icons. For the example application, the 1747-SDN scanner module should have a node address of “0” (or “00”). If you need to change a module’s node address, use the following procedure.

TIP

You can use this procedure to change the node address of other devices on the network (e.g., the Photoeye). You can also change the network data rate (baud rate) of some devices. Power must be cycled for baud rate changes to take effect.

If “00” appears to the right of the 1747-SDN icon and you do not need to change the node address or baud rate of any device, skip the remainder of this section and go to “Configuring the I/O Devices” on page 4-9.

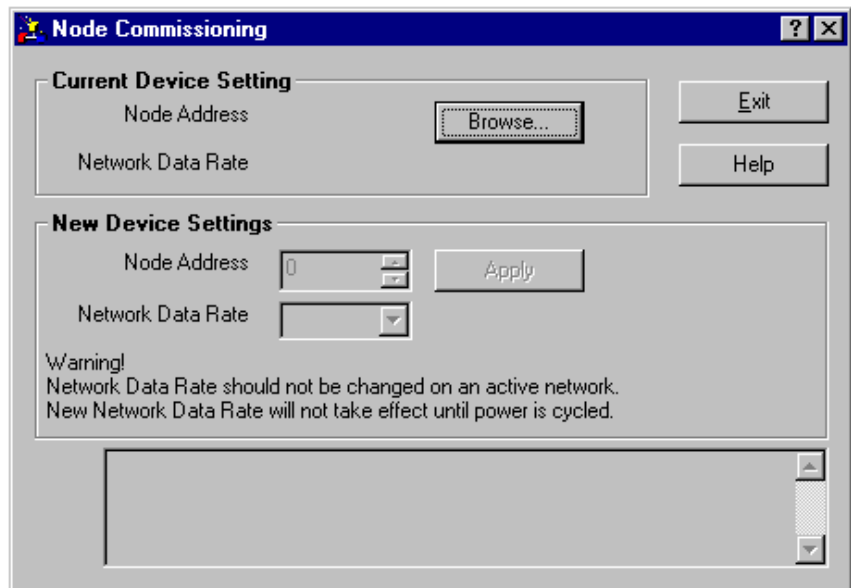
IMPORTANT

The network must not be active when performing node commissioning on the 1747-SDN module. Make sure the processor is in Program mode.

(Note that this applies only to the 1747-SDN. You may commission other devices with the processor in Run mode.)

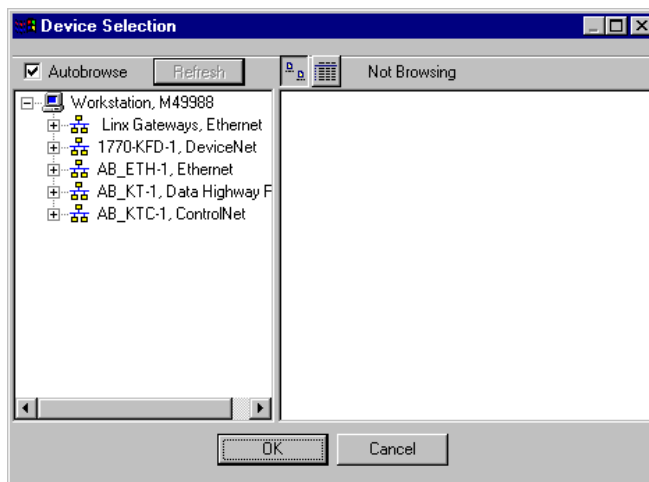
Perform the following steps:

1. From the **Tools** menu select **Node Commissioning**. You will see the **Node Commissioning** window.



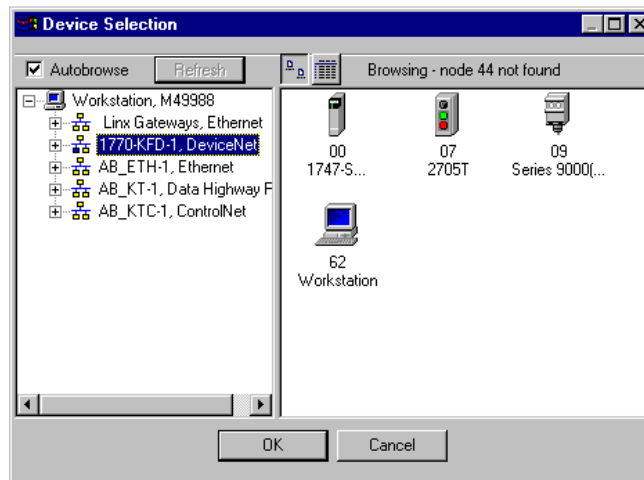
2. Click on the **Browse** button.

You will see the **Device Selection** window.



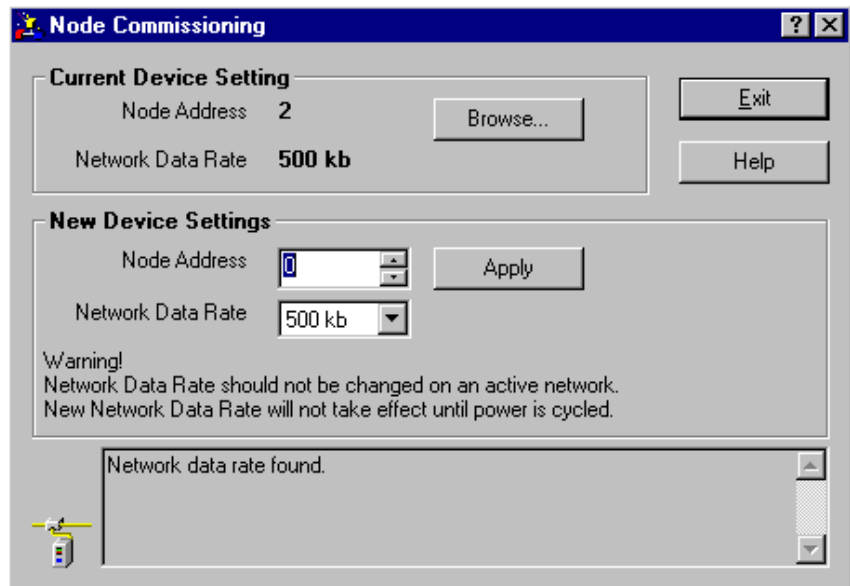
3. Select the **1770-KFD** driver.

The devices on the network will appear in the right panel of the window.



4. Select the device you are commissioning in the right panel and click on **OK**.

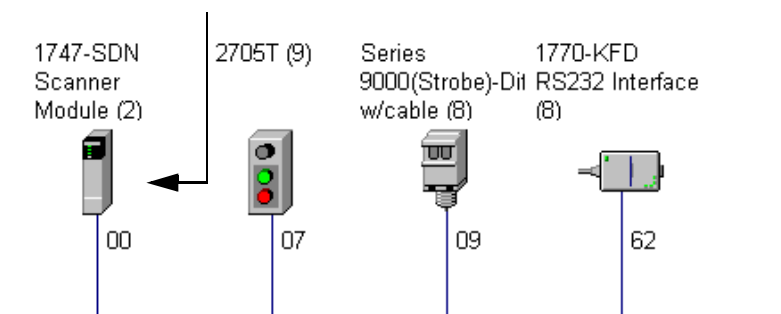
You will see the **Node Commissioning** window with the current settings for your 1747-SDN module. Your window will look similar to the one shown below.



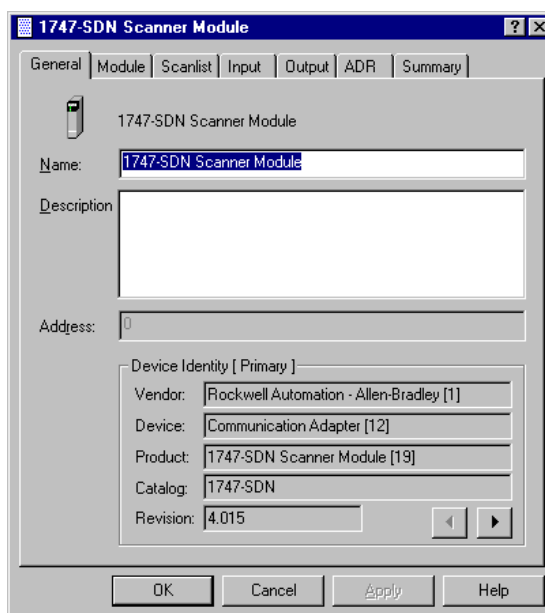
5. In the **New Device Settings: Node Address** box, enter a **0** as shown above.
6. Click on **Apply** and **Exit** the window.

Configuring the I/O Devices

1. Double-click on the **1747-SDN** module icon.



The following window will appear:



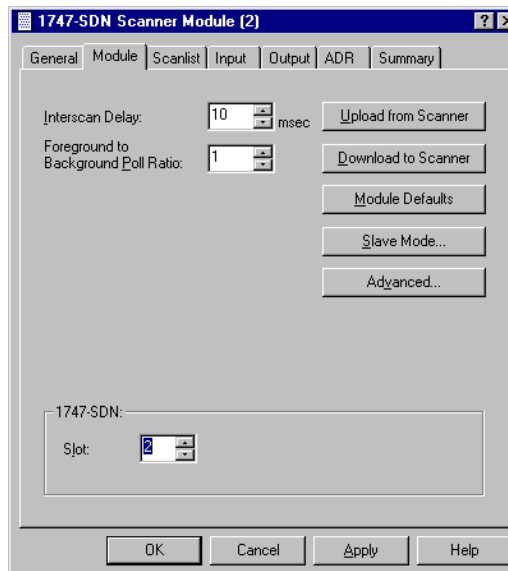
2. Select the **Module** tab.

You will receive the following prompt.



3. Click on **Upload**.

After uploading the following window will appear:

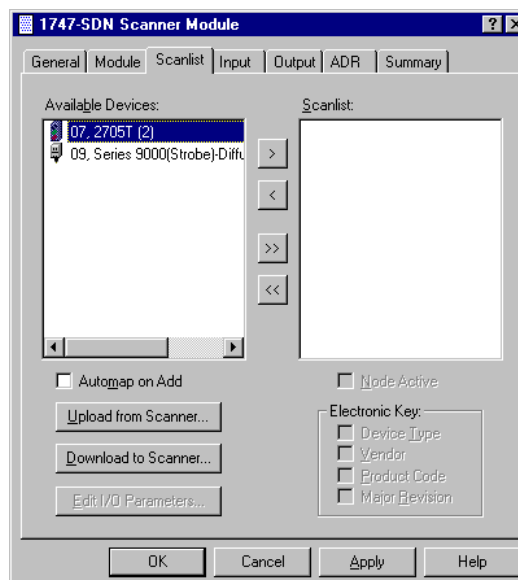


4. Make sure the **1747-SDN: Slot** number is correct for your system. We used slot 2.


TIP

We used the Module Defaults for the other settings. For an explanation of these settings click on the **Help** button.

5. Select the **Scanlist** tab.

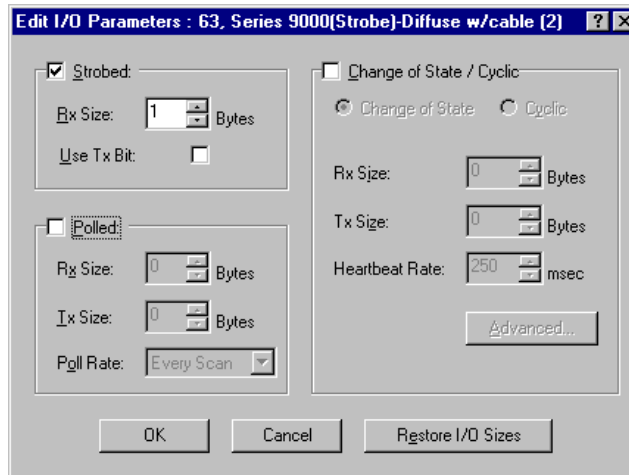


6. For this example, make sure the **Automap on Add** box is **not** checked.

- Click on the double arrow  button to add the photoeye and RediSTATION to the Scanlist.

Verifying the Photoeye Configuration

- Double-click on the **photoeye** in the Scanlist. The **Edit I/O Parameters** window will appear for the photoeye.

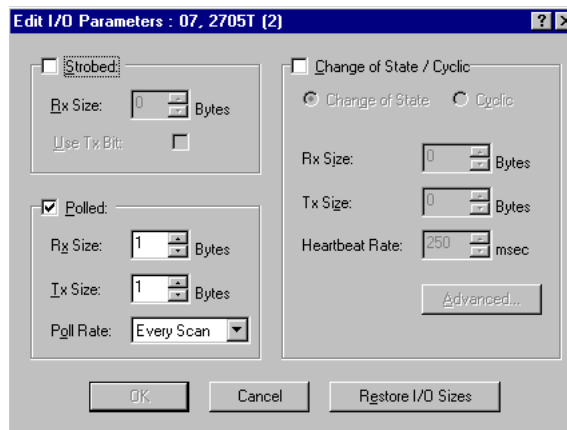


The I/O parameters define the configuration for the device in terms of how much and what data the device will exchange with the 1747-SDN module. By default, the photoeye will send 1 byte when it receives the strobe request.

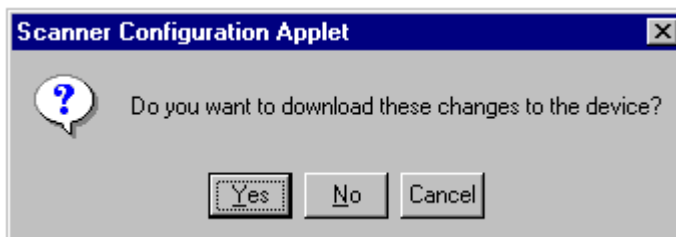
- Verify that the photoeye parameters are set as shown above.
- Click on **OK** to close the photoeye **Edit I/O Parameters** window.

Verifying the RediSTATION Configuration

- Double-click on the **RediSTATION** in the Scanlist window. The **Edit I/O Parameters** window will appear for the RediSTATION.



2. Make sure that the **Polled** box is checked and that the **Rx Size** and **Tx Size** are each 1 byte.
3. Click on **OK** to close the **Edit I/O Parameters** window for the RediSTATION.
4. Click on **OK** again. You will be prompted to download the changes to the 1747-SDN module.



5. Click on **Yes** to download the new configuration.

AutoMapping the Devices into the Scanlist

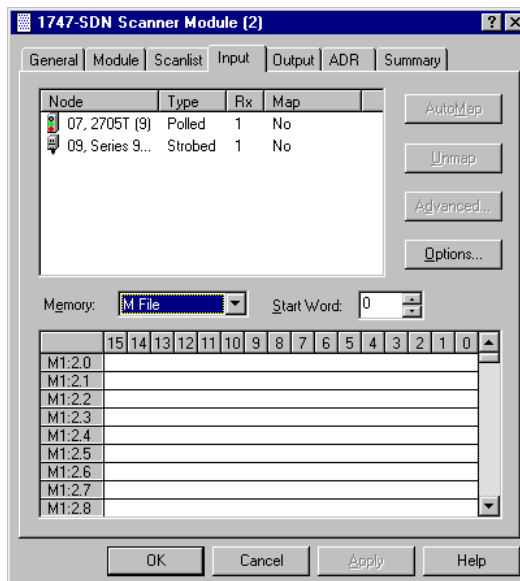
Follow the procedure below to automatically map the photoeye and RediSTATION to the SLC 500 processor.

TIP



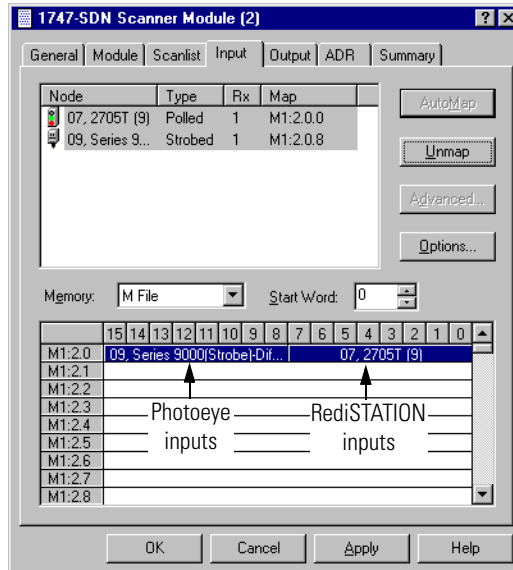
If you want to know how to map the devices manually, click on the **Help** button at the bottom of the screen and select "Map device input data manually".

1. Double-click on the **1747-SDN** module icon and select the **Input** tab.



2. In the **Memory** field, select **M File**.
3. Highlight the RediSTATION and the photoeye and click on the **AutoMap** button.

The resulting device mapping will appear in the lower panel:



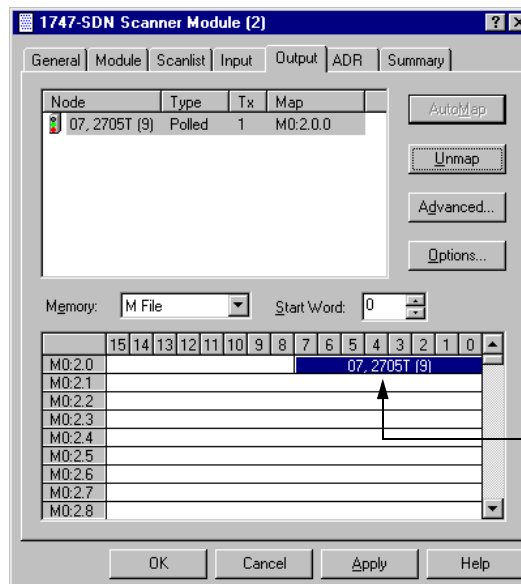
In this example, the inputs from the RediSTATION will appear in the M1 file for the device in slot 2 as word 0, bits 0 to 7. Recall from chapter 2 that the START button is bit 1 and the STOP button is bit 0. Therefore, the addresses for the RediSTATION inputs are:

START M1:2.0.1
STOP M1:2.0.0

The input from the photoeye will appear in the M1 file for the device in slot 2 as word 0, bits 8 to 15. Recall from chapter 3 that the input bit is bit 0. Therefore, the address of the photoeye input is:

M1:2.0.8

4. **Note the addresses assigned to the START and STOP buttons and the photoeye in your system.** You will enter these addresses in the example ladder program.

5. Select the **Output** tab.

After mapping the RediSTATION output address will appear here.

6. In the **Memory** field, select **M File**.7. Highlight the RediSTATION and click on the **AutoMap** button.

In this example, the output to the RediSTATION appears in the M0 file for the device in slot 2 as word 0, bits 0 to 7. Recall from chapter 3 that the indicator light is output bit 0. Therefore, the address for the RediSTATION indicator light is:

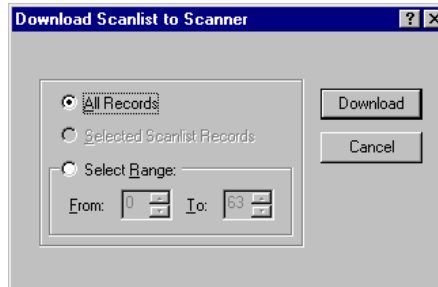
M0:2.0.0

8. **Note the address assigned to this output in your system.** You will enter this address in the example ladder logic program in the following chapter.

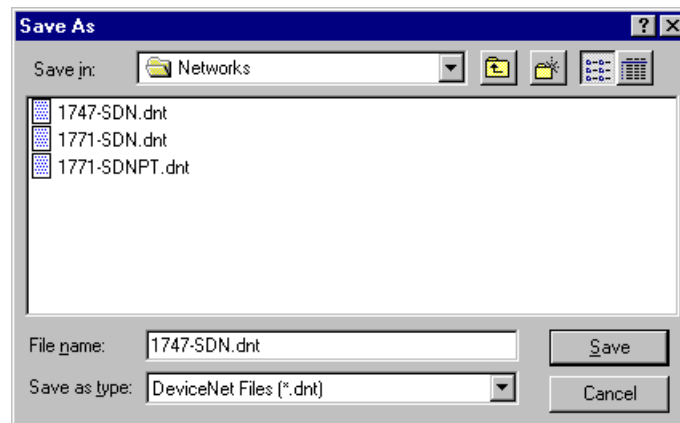
Download and Save Your Configuration

1. Click on the **Scanlist** tab and then on the **Download to Scanner** button.

You will see this window:



2. Select **All Records**.
3. Click on the **Download** button to download the configuration to the 1747-SDN scanner module.
4. Click on the **OK** button to complete the DeviceNet scanner configuration.
5. From the **File** menu select **Save As**.



6. **Save** the configuration to a DeviceNet file.
7. **Close** the RSNetWorx for DeviceNet software.

What's Next?

The next chapter describes how to configure the DeviceNet network remotely from an Ethernet, ControlNet, or Data Highway Plus network.

Communicating with DeviceNet from Another Network

What This Chapter Contains

This chapter describes how to communicate with the DeviceNet network from another network, using the SLC 500 “pass-through” feature. This feature can be used to adjust and fine tune the nodes on your network. Examples are provided for communicating from an Ethernet network and a Data Highway Plus network.

ATTENTION



The pass-through feature is not intended to replace a 1770-KFD, PCD, PCID, or PCIDS connection to the network:

- Pass-through is intended only for fine tuning and adjustment of your network devices. Do not attempt to configure your entire network using a pass-through driver or a time-out may occur.
- The pass-through method is not suitable for real time monitoring of your network devices.

The following table describes what this chapter contains and where to find specific information.

For information about	See page
Where to Find More Information	5-2
System Requirements	5-2
Communicating with DeviceNet via an Ethernet Network	5-3
Configuring the DeviceNet Pass-Through Driver	5-6
Communicating with the DeviceNet Network	5-9
Communicating with DeviceNet via a DH+ Network	5-12
Configuring the DeviceNet Pass-Through Driver	5-12
Communicating with the DeviceNet Network	5-15

Where to Find More Information



Refer to the following publications for information on configuring other networks:

For information about:	See this publication:	Publication number:
the Data Highway Plus network	SLC Modular Style Hardware Installation and Operation Manual	1747-6.2
the Ethernet interface	Ethernet SLC 500 Processors Quick Start for Experienced Users	1747-10.4
TCP/IP protocol and networking in general	Comer, Douglas E., <i>Internetworking with TCP-IP, Volume 1: Protocols and Architecture</i> , 2nd ed. Englewood Cliffs, N.J.:Prentice-Hall, 1995. ISBN 0-13-216987-8.	n/a
	Tannebaum, Andrew S. <i>Computer Networks</i> , 2nd ed. Englewood Cliffs, N.J.: Prentice-Hall, 1989. ISBN 0-13-162959-X.	n/a

System Requirements

To use the pass-through feature you must have the following versions of the RSLinx software and 1747-SDN module firmware:

Component	Software/Firmware Version
RSLinx software	2.10 or higher
1747-SDN module	4.015 or higher

IMPORTANT

To enable pass-through access with a SLC 500 processor, you must use RSLogix 500 to configure the M0 and M1 files associated with the 1747-SDN module with a minimum length of 361 words. You can access the M file configuration by launching I/O Configuration within RSLogix 500, and then selecting the 1747-SDN. See Appendix E for details.

The SLC 500 processor must be placed in Run mode at least once since its last power cycle for 1747-SDN pass-through transactions to succeed.

IMPORTANT

You must have previously set up the network you will use to communicate with the DeviceNet network and have installed and configured the appropriate drivers and interface hardware.

The SLC 500 chassis used for these examples was set up with the following hardware mapping. The SLC 5/04 processor was used for the DH+ example. The SLC 5/05 processor was used for the Ethernet example.

Module	Slot	DH+ Address	Ethernet Address	DeviceNet Address
SLC 500 5/04 Processor	0	1	-	-
SLC 500 5/05 Processor	0	-	130.130.130.2	-
1747-SDN	2	-	-	0

Communicating with DeviceNet via an Ethernet Network

Before performing this example the Ethernet network must be configured and running. You must use an Ethernet SLC 5/05 processor (catalog number 1747-L551, 1747-L552, or 1747-L553).

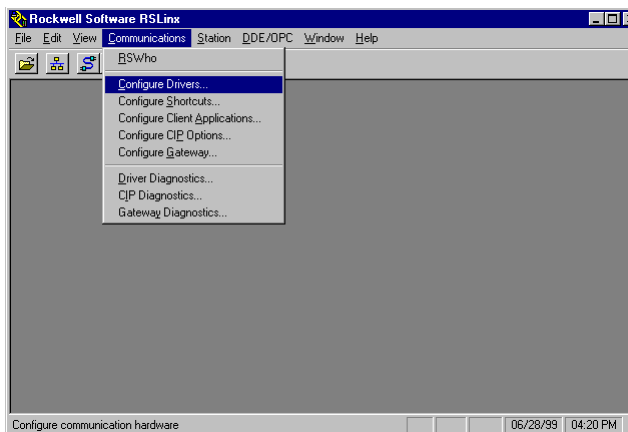
Establishing Ethernet pass-through communications involves four main steps:

1. You use RSLinx to configure the Ethernet to SLC-5 driver to communicate with the SLC 5/05 processor over the Ethernet Network. This procedure is described on pages 5-4 to 5-6.
2. After you configure the Ethernet to SLC-5 driver, you use RSLinx to configure the DeviceNet pass-through driver to communicate with the 1747-SDN module via the SLC 5/05 processor and the Ethernet network. This procedure is described on pages 5-6 to 5-9.
3. You configure the SLC 5/05's Ethernet communication channel. This can be done using RSLogix 500 software when you create the example ladder program. The Ethernet channel configuration is described in Appendix B.
4. You use the pass-through driver with RSNetWorx for DeviceNet software to adjust and tune your DeviceNet network. The procedure for doing this is described on pages 5-9 to 5-11.

Configuring the Ethernet to SLC-5 Communications Driver

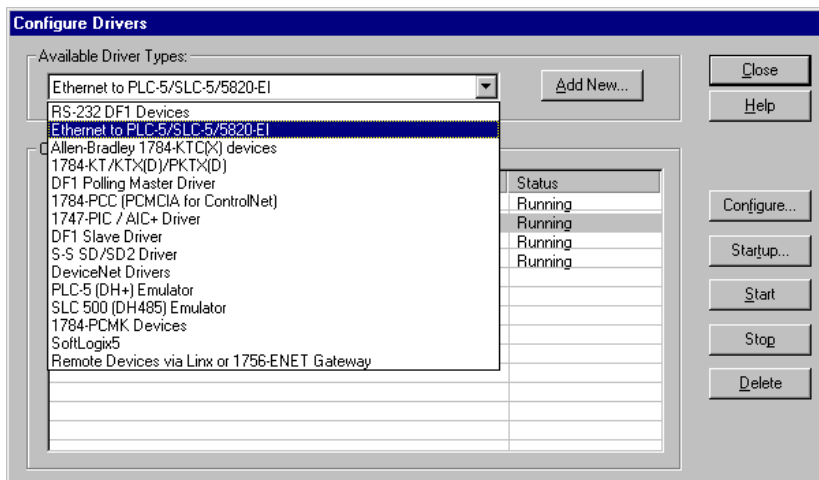
To communicate with your SLC 500 processor over Ethernet you must configure the Ethernet to SLC 500 driver. Perform the following steps to configure the driver using RSLinx software.

1. Start **RSLinx**.



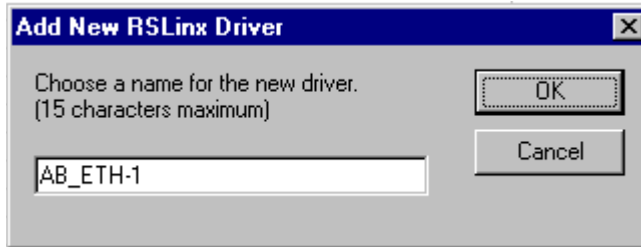
2. From the **Communications** menu, select **Configure Drivers**.

The **Configure Drivers** window will appear.



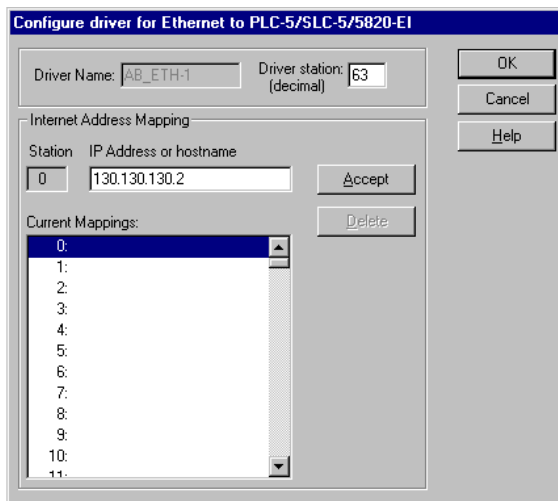
3. From the list of **Available Driver Types**, select the **Ethernet to PLC-5/SLC-5/5820-EI** driver and click on **Add New**.

You will be prompted to choose a name for the new driver.



4. Enter an appropriate driver name (e.g., **AB_ETH-1**) and click on the **OK** button.

The **Configure driver for Ethernet to PLC-5/SLC-5/5820-EI** window will open.



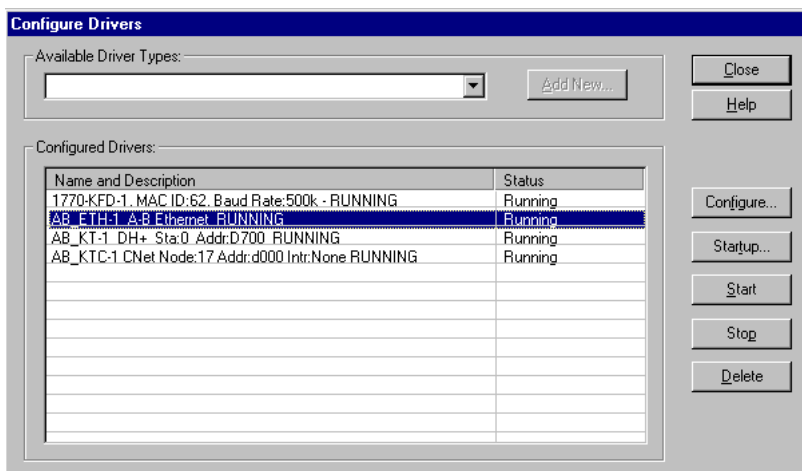
5. In the **IP address or hostname** field, enter the IP address of the SLC 5/05 processor (**130.130.130.2** in this example).

IMPORTANT

You must configure channel 0 of the SLC 5/05 processor with the same IP address you enter here.

6. Click on the **Accept** button. Then click on **OK**.

The new driver will be added to the list of Configured Drivers in RSLinx. (Your list will contain the drivers you have configured.)

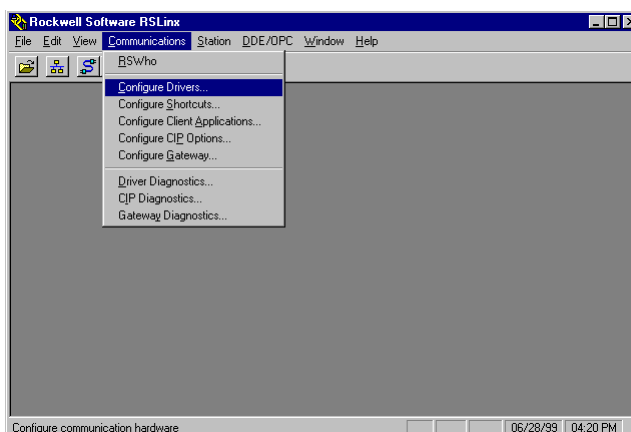


Configuring the DeviceNet Pass-Through Driver

Before you can communicate with the 1747-SDN module via the Ethernet network, you must configure the DeviceNet pass-through driver (1747-SDNPT) using RSLinx, version 2.10 or higher. You must also have configured the **Ethernet to PLC-5/SLC-5/5820-EI** driver as described in the previous section and configured the SLC 5/05 processor's Ethernet communications channel as described in Appendix B.

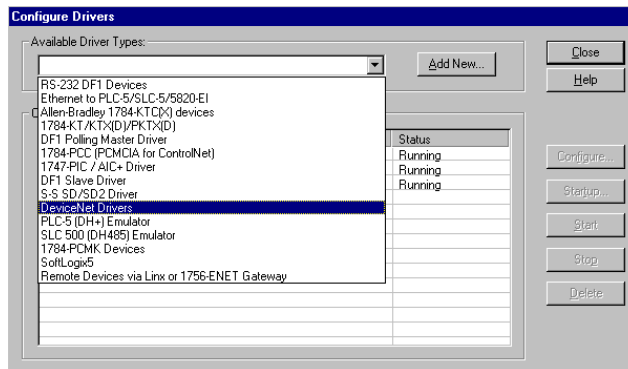
Perform the following steps:

1. Start **RSLinx**.



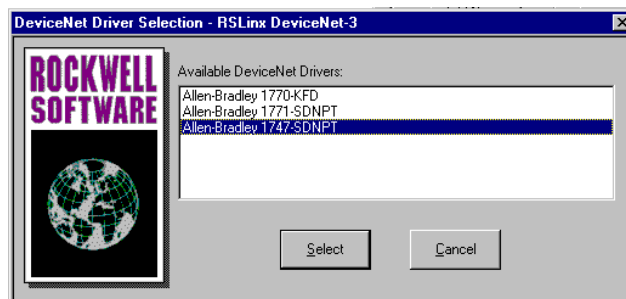
2. From the **Communications** menu, select **Configure Drivers**.

The **Configure Drivers** window will appear.



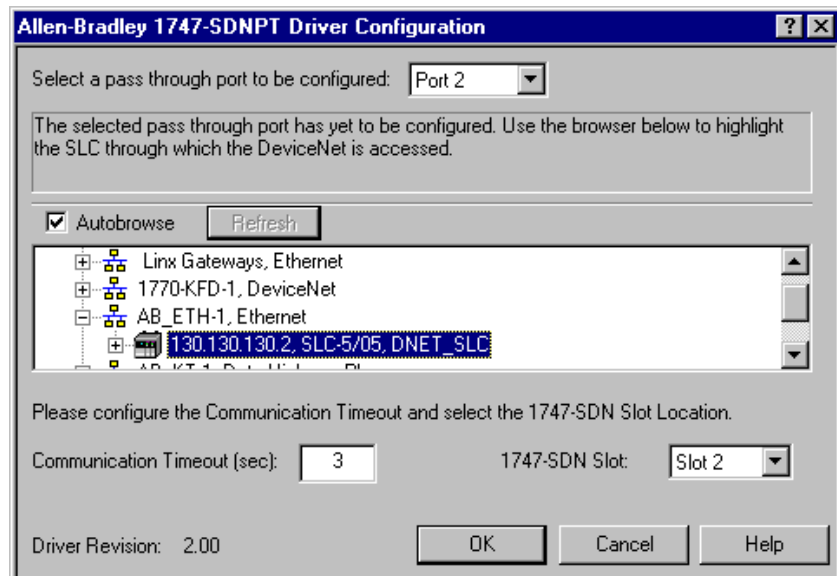
- From the list of **Available Driver Types** select **DeviceNet Drivers** and click on **Add/New**.

You will see the following list of drivers.



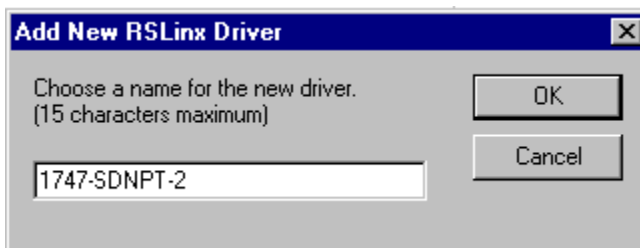
- Select the **Allen-Bradley 1747-SDNPT** driver.

The **Allen-Bradley 1747-SDNPT Driver Configuration** window will open.



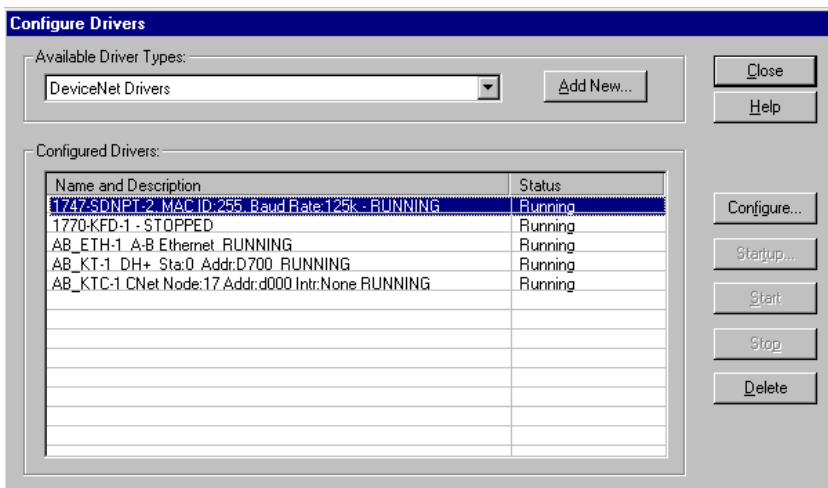
5. Select a pass-through port to be configured from the pull-down list, e.g., **Port 2**.
6. Expand your Ethernet driver (**AB_ETH-1**) and highlight the SLC 5/05 processor.
7. Verify that the 1747-SDN Slot is correct.
8. Click on **OK**.

You will be prompted to enter a name for the driver.



9. Enter an appropriate driver name (e.g., **1747-SDNPT-2**) and click on the **OK** button.

The new driver will be added to the list of **Configured Drivers** in RSLinx. (Your list will contain the drivers you have configured for your system.)



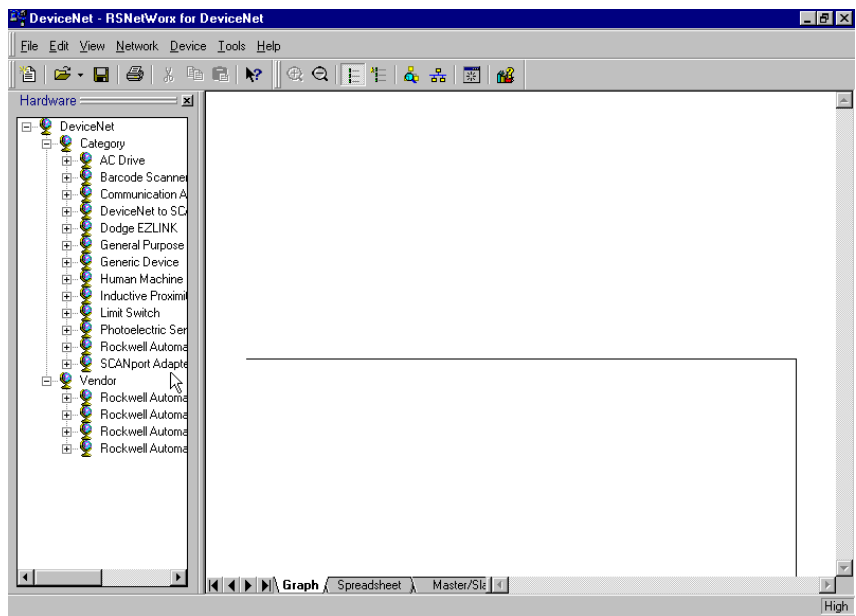
10. **Close** or **Minimize** RSLinx.

Communicating with the DeviceNet Network

Once you have the Ethernet pass-through driver configured, you can use RSNetWorx for DeviceNet to communicate with the DeviceNet network via the Ethernet network.

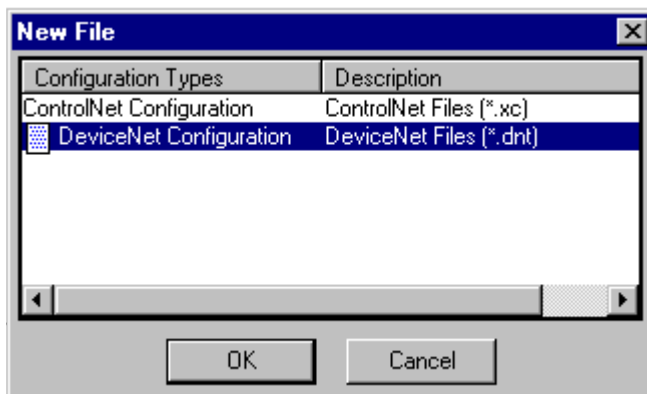
Perform the following steps:

1. Start **RSNetWorx for DeviceNet**.



2. From the **File** menu, select **New**.

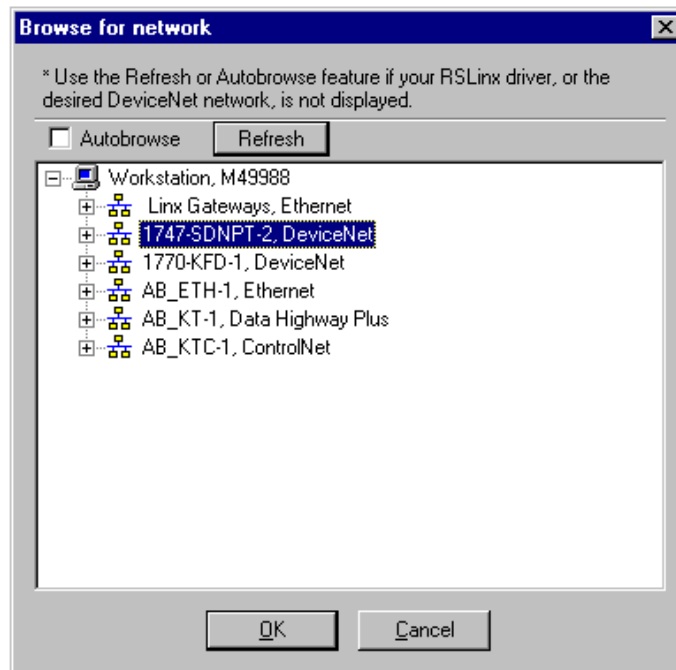
If you have ControlNet configured on your system, you may see the following window. Otherwise, proceed to step 4.



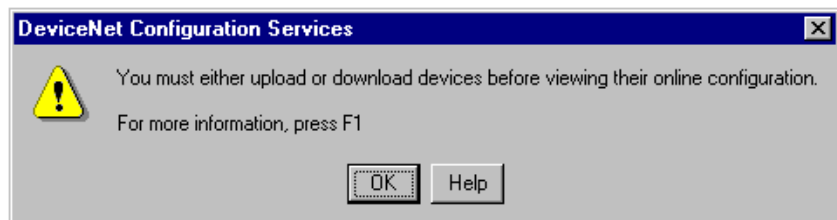
3. Select **DeviceNet Configuration** and click on **OK**.

4. Click on the **Online** button on the toolbar.

The **Browse for network** window will appear. You will see the drivers you have configured on your system.



5. Highlight the **1747-SDNPT-2, DeviceNet** driver and click on **OK**. You will receive the following prompt:



6. Click on **OK** to upload the devices.
RSNetWorx for DeviceNet will begin browsing for network devices.

ATTENTION

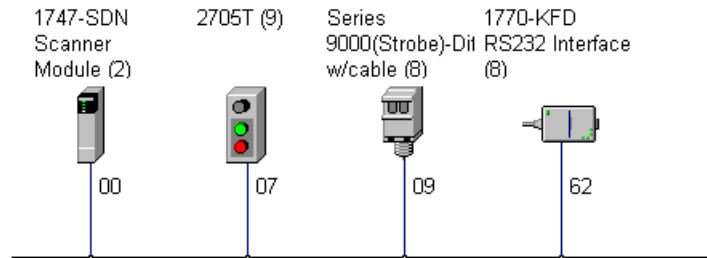
Performing a pass-through browse via the Ethernet network will take longer than browsing using the 1770-KFD DeviceNet driver as described in chapter 4.

Note that due to the time required, the pass-through method is not suitable for configuring a network nor for real time monitoring of your network devices.

When RSNetWorx for DeviceNet is finished browsing, the network displayed on your screen should look similar to the one shown below.

TIP

If RSNetWorx fails to find a device, check the physical connection to that device.



You are now online to the DeviceNet network via the Ethernet network. See pages 4-9 to 4-15 of this manual for examples of how to use RSNetWorx for DeviceNet to adjust network parameters.

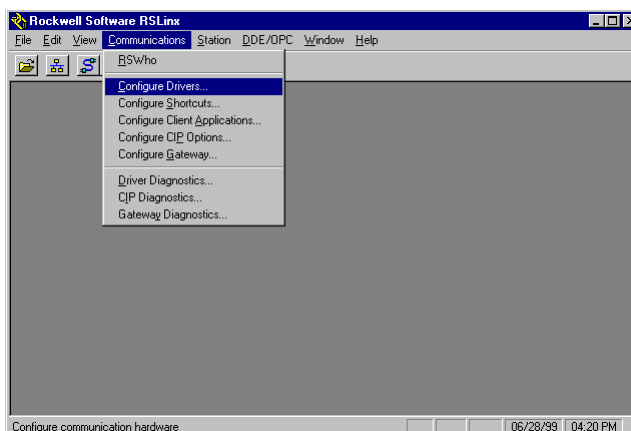
Communicating with DeviceNet via a DH+ Network

Before performing this example the DH+ network must be configured and running. This example uses a SLC 5/04 processor. The SLC 5/04 processor lets you operate DH+ communication protocol by means of DH+ communication channel 1.

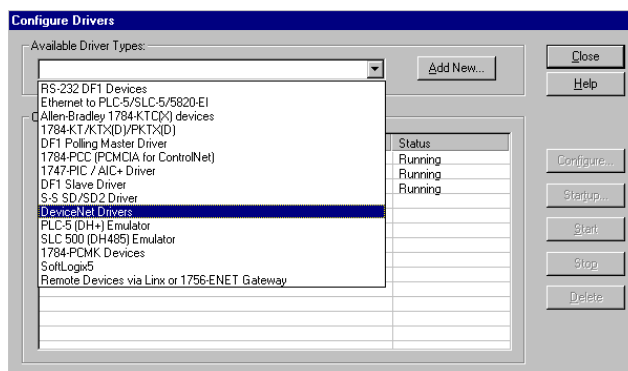
Configuring the DeviceNet Pass-Through Driver

Before you can communicate with the 1747-SDN module via a DH+ network, you must first configure the DeviceNet pass-through driver (1747-SDNPT) with a DH+ port using RSLinx, version 2.10 or higher. Use the following procedure:

1. Start **RSLinx**.

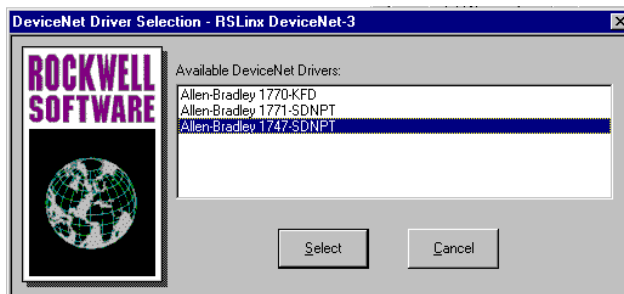


2. From the **Communications** menu, select **Configure Drivers**.
The **Configure Drivers** window will appear.



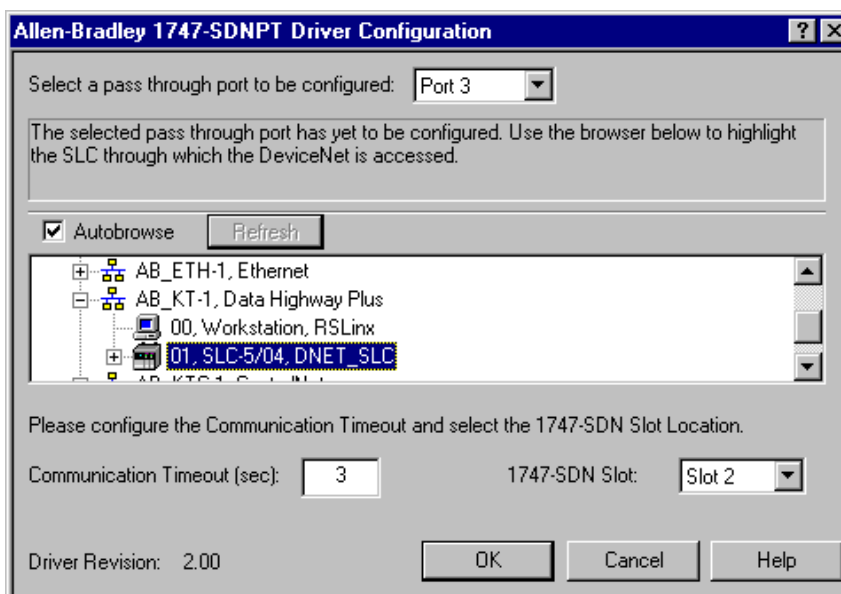
3. Select **DeviceNet Drivers** from the **Available Driver Types** pull-down list and click on **Add/New**.

You will see the following list of drivers.




4. Select the **Allen-Bradley 1747-SDNPT** driver.

The **Driver Configuration** window will appear.



5. Select a pass-through port to be configured from the pull-down list, e.g., **Port 3**.
6. Expand your DH+ driver (**AB_KT-1** above) and highlight the SLC 500 processor.
7. Verify that the 1747-SDN Slot is correct.
8. Click on **OK**.



Add New RSLinx Driver

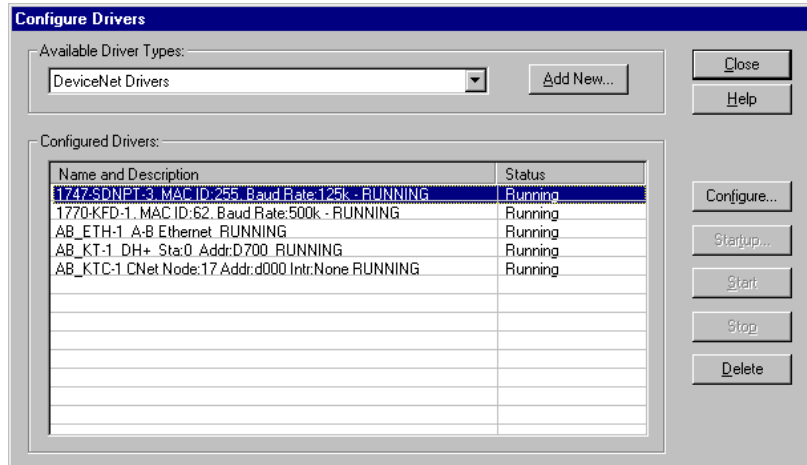
Choose a name for the new driver.
(15 characters maximum)

1747-SDNPT-3

OK

Cancel

- The new driver will be added to the **Configured Drivers** in RSLinx. (Your list will contain the drivers you have configured for your system.)



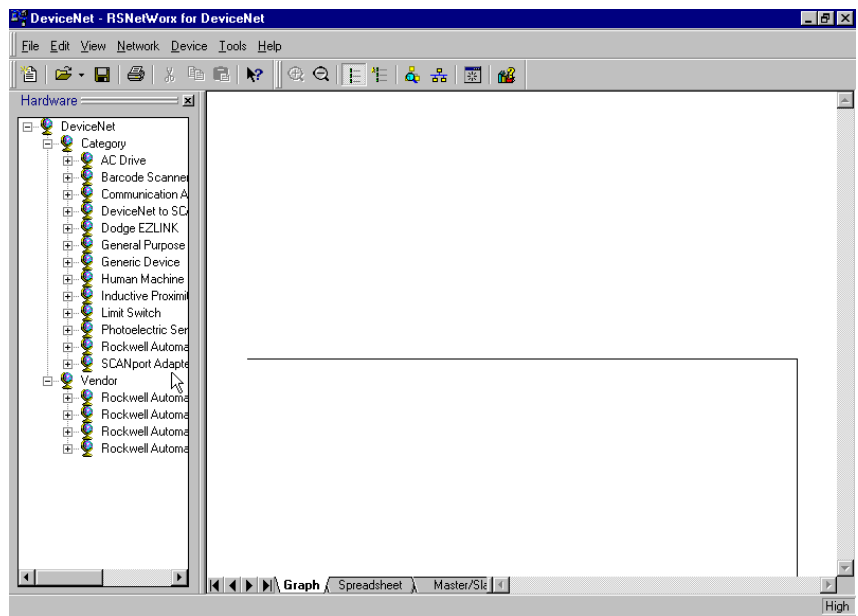
- 10. Close or Minimize** RSLinx.

Communicating with the DeviceNet Network

Once you have the DH+ pass-through driver configured, you can use RSNetWorx for DeviceNet to communicate with the DeviceNet network via the DH+ network.

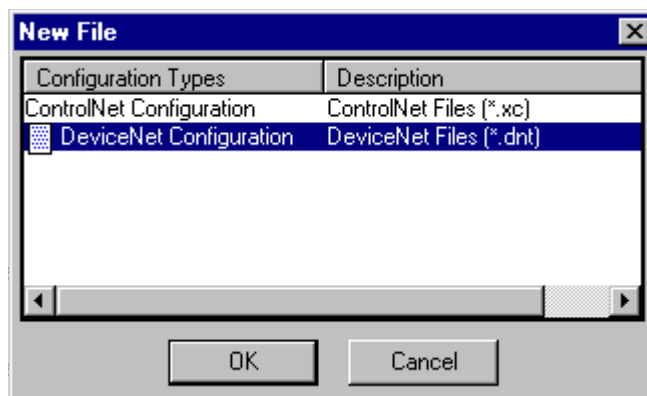
Perform the following steps:

1. Start **RSNetWorx for DeviceNet**.



2. From the **File** menu, select **New**.

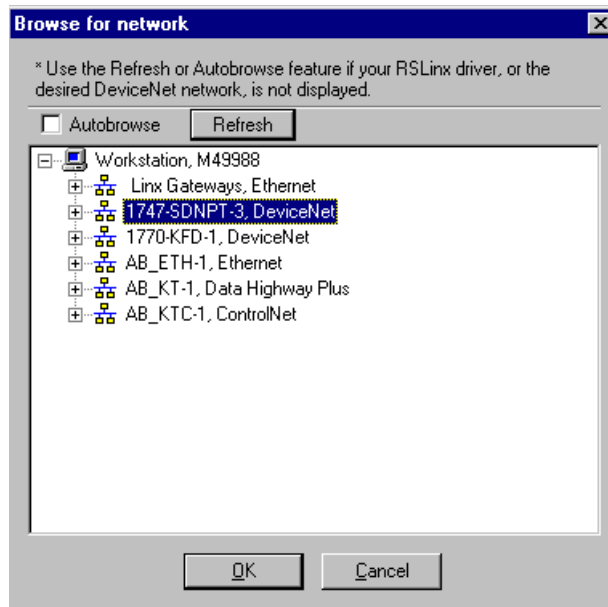
If you have ControlNet configured on your system, you may see the following window. Otherwise, proceed to step 4.



3. Highlight **DeviceNet Configuration** and click on **OK**.

4. Click on the **Online** button  on the toolbar.

The **Browse for network** window will appear. You will see the drivers you have configured on your system.



5. Highlight the **1747-SDNPT-3** driver and click on **OK**.

You will receive the following prompt:



6. Click on **OK** to upload the devices.

RSNetWorx for DeviceNet will begin browsing for network devices.

ATTENTION

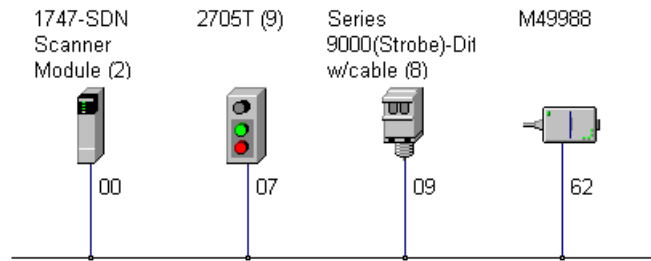
Performing a pass-through browse via the DH+ network will take longer than browsing using the 1770-KFD DeviceNet driver as described in chapter 4.

Note that due to the time required, the pass-through method is not suitable for configuring a network nor for real time monitoring of your network devices.

When the software is finished browsing, the network should look similar to the one shown below.

TIP

If RSNetWorx fails to find a device, check the physical connection to that device.



You are now online to the DeviceNet network via the Data Highway Plus network. See pages 4-9 to 4-15 of this manual for examples of how to use RSNetWorx for DeviceNet to adjust network parameters.

What's Next?

The next chapter describes how to create and run the example application program to test the DeviceNet Network.

Creating and Running the Example Application Program

What This Chapter Contains

This chapter describes the procedure to create, download, and run an example ladder logic program to test the DeviceNet network. When the processor is put into Run mode, pressing the START button on the network's RediSTATION will cause the red indicator light to come on and stay on until the STOP button is pressed. Passing an object in front of the photoeye will increment a counter.

Recall that you cannot directly communicate with the SLC 500 processor over the DeviceNet network. This chapter shows how to download and run the program over a ControlNet, Ethernet, or Data Highway Plus network.

The SLC 500 I/O chassis used for these examples was set up with the following hardware:

Module	Slot	DH+ Address	Ethernet Address	ControlNet Address	DeviceNet Address
SLC 500 5/04 ⁽¹⁾ Processor	0	1	-	-	-
SLC 500 5/05 ⁽²⁾ Processor	0	-	130.130.130.2	-	-
1747-KFC15	1	-	-	16	-
1747-SDN	2	-	-	-	0

⁽¹⁾ Used for Data Highway Plus and ControlNet examples.

⁽²⁾ Used for Ethernet example.

The following table describes what this chapter contains and where to find specific information.

For information about	See page
Installing the Software	6-2
Creating the Example Application Program	6-2
Downloading and Running the Program	6-4
Downloading and Running the Program via a ControlNet Network	6-4
Downloading and Running the Program via an Ethernet Network	6-6
Downloading and Running the Program via a DH+ Network	6-8

Installing the Software

Perform the following steps to install the software.

1. Insert the software CD-ROM installation disk in the drive.

The CD-ROM supports Windows Autorun. If you have Autorun configured, the installation will automatically start when you insert the CD-ROM in your drive. If you do not have Autorun configured, perform steps 2 and 3.

2. From the Windows **Start** menu, select **Run**.
3. Browse for the **Setup** program on the CD ROM and open it.
4. Follow the prompts that appear on the screen as you install the software.

Creating the Example Application Program

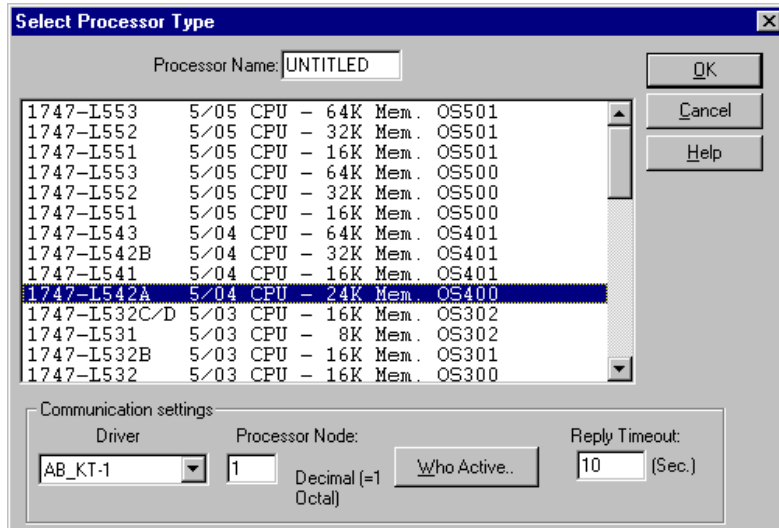
Perform the following steps to create the example application program.

1. Start the **RSLogix 500** programming software. You will see the following screen.



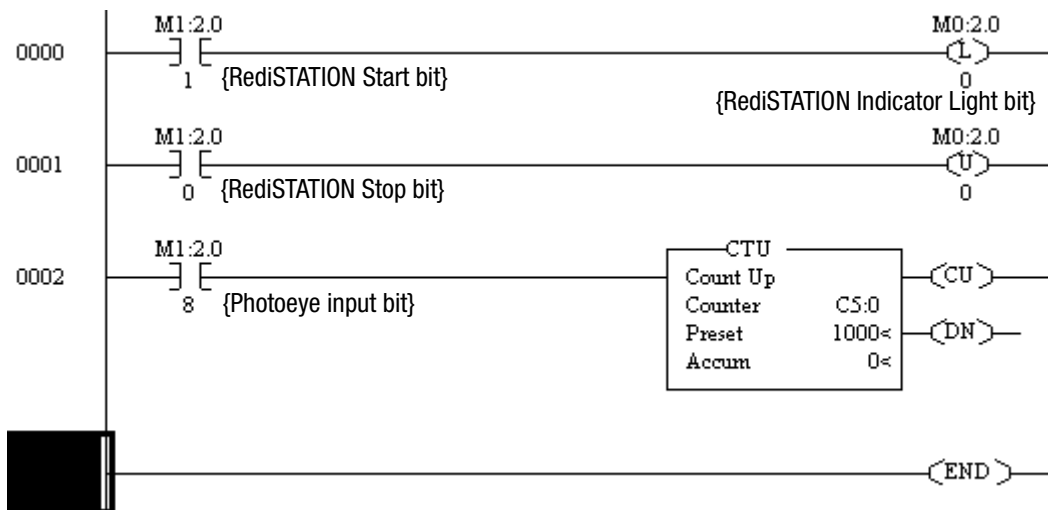
2. From the **File** menu select **New**.

The **Select Processor Type** window will open.



3. Select your Processor Type from the list (e.g., 1747-L542A) and click on **OK**.
4. Enter the following ladder program.

Note that the program uses the addresses mapped to the devices by RSNetWorx for DeviceNet in chapter 4.



5. Save the program using an appropriate name, e.g., "1747-SDN".

Downloading and Running the Program

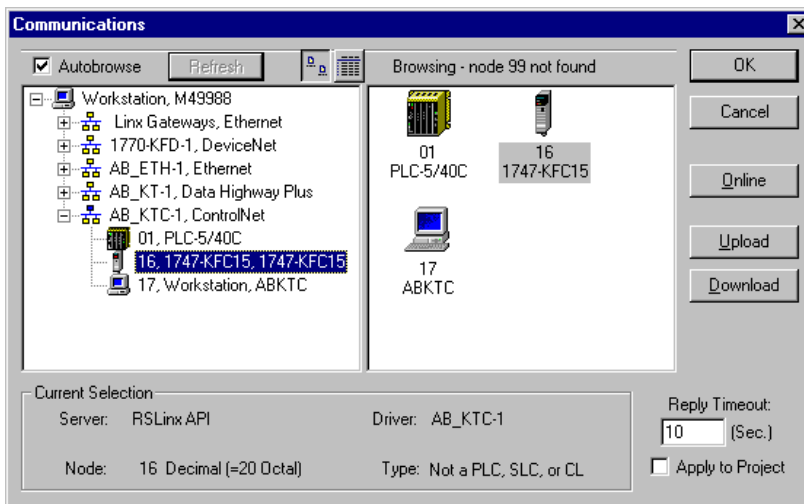
You cannot go online to the processor directly over the DeviceNet network. The following sections provide examples of downloading and running the program using the following networks:

- ControlNet (page 6-4)
- Ethernet (page 6-6)
- Data Highway Plus (page 6-8)

Downloading and Running the Program via a ControlNet Network

Follow the procedure below to download and run the example program via a ControlNet network.

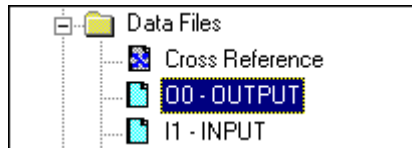
1. Click on the RSLogix 500 **Communications** menu and select **System Comms**.
2. The **Communications** window will appear (Your window may look different depending upon the drivers and other devices you have installed):



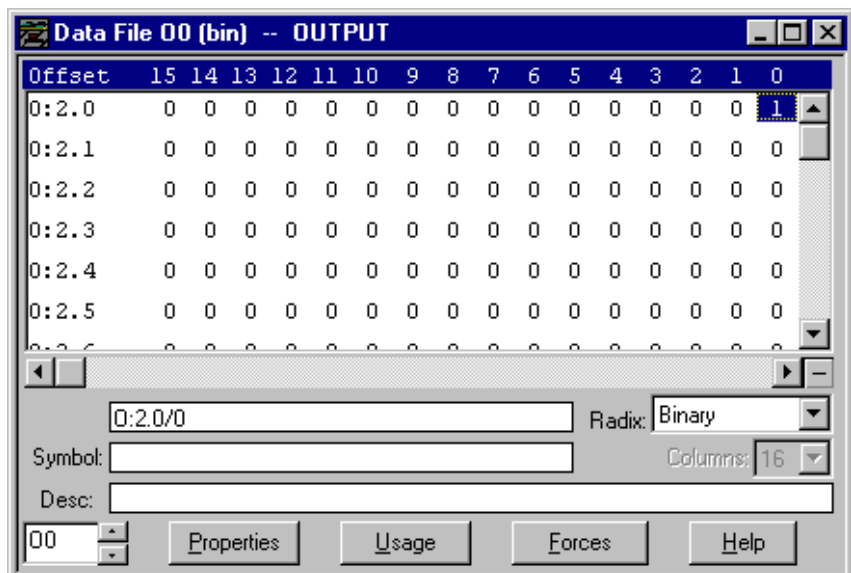
3. Select the "+" next to your ControlNet driver (**AB_KTC-1** above) to expand the tree.
4. Highlight the 1747-KFC15 module as shown above and click on the **Download** button. Your program will be downloaded to the controller.
5. After the download is complete, change the SLC 500 processor mode to **Run**.

IMPORTANT

You must also place the 1747-SDN scanner in run mode by setting the Run Bit (bit 0) in the scanner's command register. The command register is located at word 0 in the Output image table.



6. Double-click on the **00 - OUTPUT** file under the **Data Files** folder. You will see the 1747-SDN module's command register (file O:2.0 below).



7. Set bit 0 in the command register to "1", as shown above.
8. Press and release the **START** button on the RediSTATION. The red light should turn on. On your screen, you will see rung 1 in your ladder program being energized as you press the button.
9. Pass your hand back and forth over the photoeye several times. On your screen you should see the counter increment.
10. Press and release the **STOP** button on the RediSTATION. The red light should turn off. On your screen, you will see rung 2 in your ladder program being energized as you press the button.

This completes the ControlNet example.

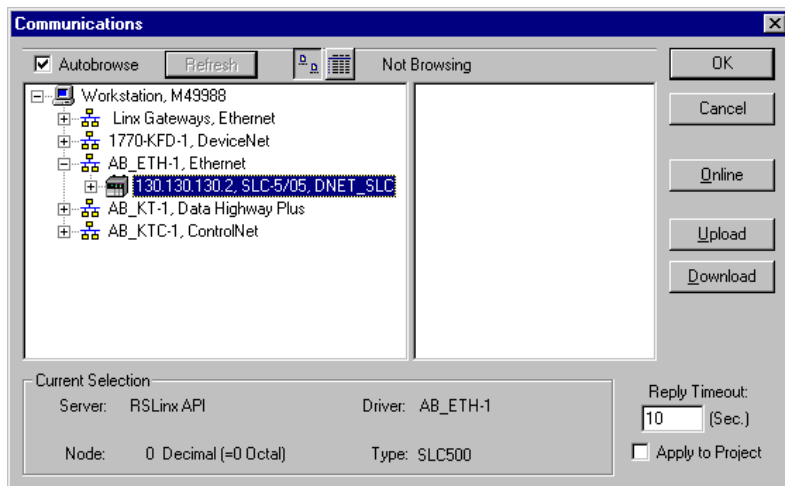
Downloading and Running the Program via an Ethernet Network

IMPORTANT

To communicate with your SLC 5/05 processor over an Ethernet network you must first configure the processor's Ethernet communications channel and assign it a unique IP address. See Appendix B for information on configuring the Ethernet communications channel.

Follow the procedure below to download and run the example program via an Ethernet network.

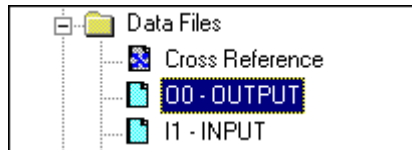
1. Click on the RSLogix 500 **Communications** menu and select **System Comms**.
2. The **Communications** window will open (Your window may look different depending upon the drivers you have installed):



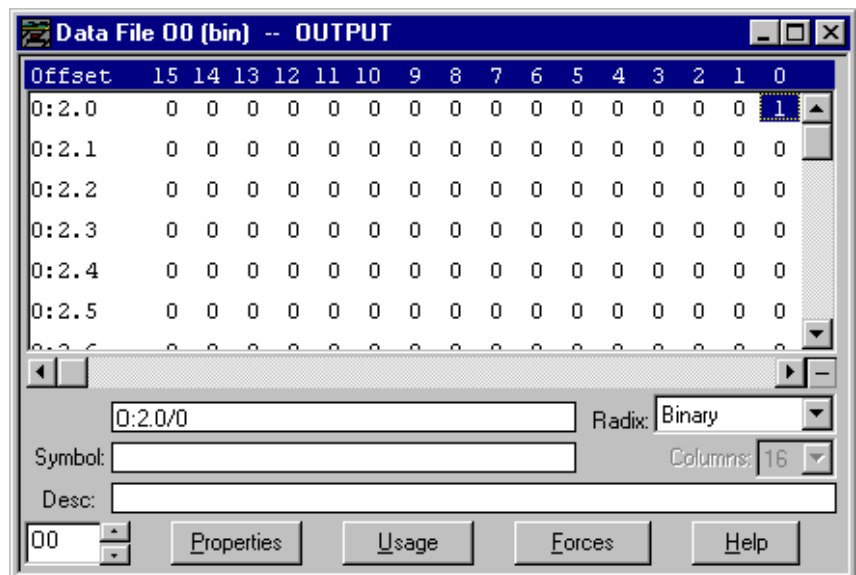
3. Select the "+" next to your **Ethernet** driver (**AB-ETH-1** above) to expand the tree.
4. Highlight the SLC 500 processor as shown above and click on the **Download** button.
5. After the download is complete, change the SLC 500 processor mode to **Run**.

IMPORTANT

You must also place the 1747-SDN scanner in run mode by setting the Run Bit (bit 0) in the scanner's command register. The command register is located at word 0 in the Output image table.



6. Double-click on the **00 - OUTPUT** file under the **Data Files** folder. You will see the 1747-SDN module's command register (file O:2.0 below).



7. Set bit 0 in the command register to "1", as shown above.
8. Press and release the **START** button on the RediSTATION. The red light should turn on. On your screen, you will see rung 1 in your ladder program being energized as you press the button.
9. Pass your hand back and forth over the photoeye several times. On your screen you should see the counter increment.
10. Press and release the **STOP** button on the RediSTATION. The red light should turn off. On your screen, you will see rung 2 in your ladder program being energized as you press the button.

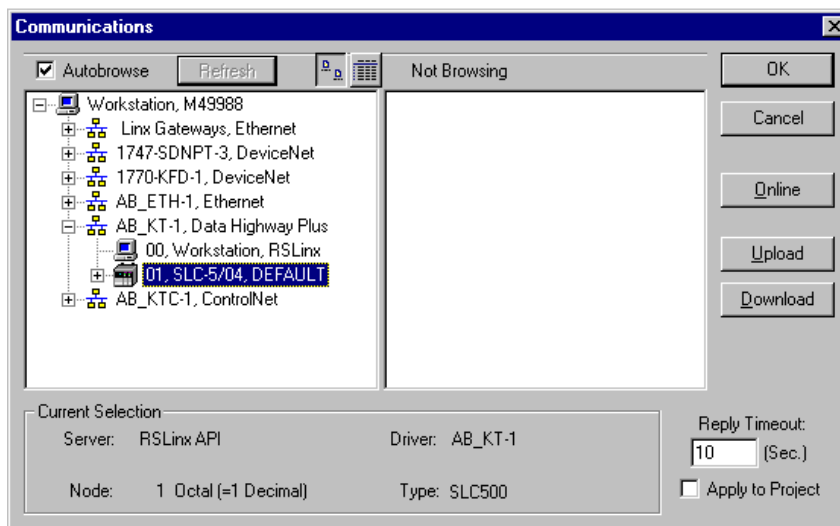
This completes the Ethernet example.

Downloading and Running the Program via a DH+ Network

Follow the procedure below to download and run the example program via a DH+ network.

1. Click on the **Comms** menu in RSLogix 500 and select **System Communications**.

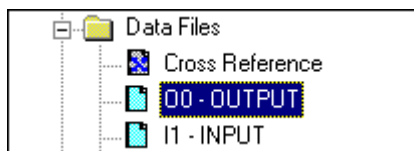
RSLink will start, and the **Communications** window will open.



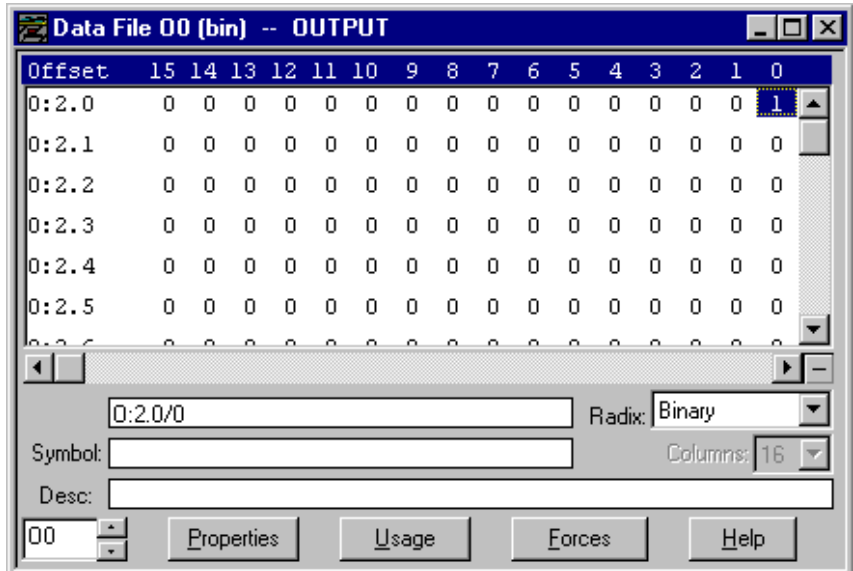
2. Select your Data Highway Plus driver (**AB_KT-1, Data Highway Plus** in the above example).
3. Select the "+" next to your Data Highway Plus driver (**AB_KT-1** above) to expand the tree.
4. Highlight the SLC 500 processor and click on the **Download** button.
5. After the download is complete, go **Online** and put the SLC 500 processor in **Run** mode.

IMPORTANT

You must also place the 1747-SDN scanner in run mode by setting the Run bit (bit 0) in the scanner's command register. The command register is located at word 0 in the Output image table.



6. Double-click on the **00 - OUTPUT** file under the **Data Files** folder. You will see the 1747-SDN module's command register (file O:2.0 below).



7. Set bit 0 in the command register to "1", as shown above.
8. Press and release the **START** button on the RediSTATION. The red indicator light should turn on. On your screen, you should see rung 0 in your ladder program being energized when you press the button.
9. Pass your hand back and forth over the photoeye several times. On your screen you should see the counter incrementing.
10. Press and release the **STOP** button on the RediSTATION. The red indicator light should turn off. On your screen, you should see rung 1 in your ladder program being energized when you press the button.

This completes the Data Highway Plus example.

What's Next?

This concludes the application examples. The following chapter describes how the diagnostic indicators on the 1747-SDN module can be used for troubleshooting.

Troubleshooting

The 1747-SDN interface module is provided with LED diagnostic indicators on its front panel. The diagnostics provided by these indicators are described in this chapter.

For information about	See page
Module Status Indicator	7-1
Network Status Indicator	7-2
Numeric Display Code Summary	7-3

Module Status Indicator

The bicolor (green/red) Module Status indicator (MODULE) indicates whether the 1747-SDN module has power and is functioning properly.

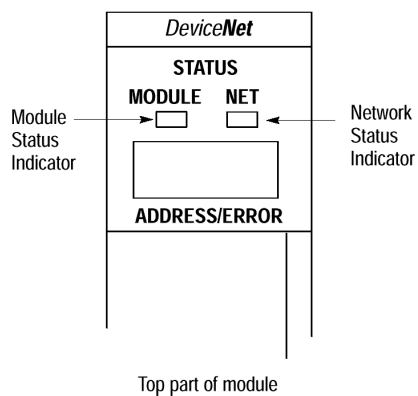


Table 7.A - Module Status Indicator

If the MODULE indicator is:	Then:	Take this action:
Off	There is no power applied to the module.	Verify power connections and apply power.
Green	The module is operating normally.	No action required.
Flashing Green	The module is not configured.	Configure the module.
Flashing Red	There is an invalid configuration.	Check configuration setup.
Red	The module has an unrecoverable fault.	Replace the module.

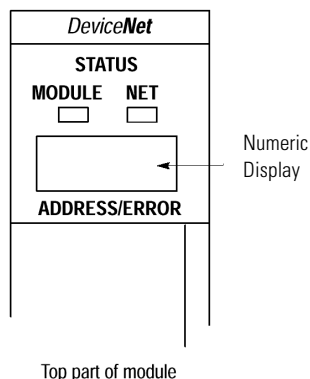
Network Status Indicator

The bicolor (green/red) network status indicator (NET) provides troubleshooting information about the DeviceNet channel communication link.

Table 7.B - Network Status Indicator

If the NET indicator is:	Then	Which indicates	Take this action
Off	The device has no power or the channel is disabled for communication due to bus off condition, loss of network power, or has been intentionally disabled.	The channel is disabled for DeviceNet communication.	Power-up the module, provide network power to the channel, and be sure the channel is enabled in both the module configuration table and the module command word.
Green	Normal operation.	All slave devices in the scan list table are communicating normally with the module.	None.
Flashing Green	The two-digit numeric display for the channel indicates an error code that provides more information about the condition of the channel.	The channel is enabled but no communication is occurring.	Configure the scan list table for the channel to add devices.
Flashing Red	The two-digit numeric display for the channel displays an error code that provides more information about the condition of the channel.	At least one of the slave devices in the module's scan list table has failed to communicate with the module.	Examine the failed device and the scan list table for accuracy.
Red	The communications channel has failed. The two digit numeric display for the channel displays an error code that provides more information about the condition of the channel.	The module may be defective.	Reset module. If failures continue, replace module.

Numeric Display Code Summary



The 1747-SDN module uses numeric codes to display diagnostic information about its status. The display flashes at one second intervals. The following table summarizes the meanings of the numeric codes.

Table 7.C - Numeric Display Code Summary

Numeric Code	Description	Take this action
0 - 63	Normal operation. The numeric display indicates the 1747-SDN's node address on the DeviceNet network.	None.
70	Module failed Duplicate Node Address check.	Change the module channel address to another available one. The node address you selected is already in use on that channel.
71	Illegal data in scan list table (node number alternately flashes).	Reconfigure the scan list table and remove any illegal data.
72	Slave device stopped communicating (node number alternately flashes).	Inspect the field devices and verify connections.
73	Device key parameters do not match scan list table entry (node number alternately flashes).	Enter a matching scan list device ID. Make sure that the device at the flashing node address matches the desired key parameters (vendor, product code, product type).
74	Data overrun on port detected.	Modify your configuration and check for invalid data.
75	No scan list is active in the module.	Enter a scan list.
76	No direct network traffic for module detected.	None. The module hears other network communication.
77	Data size returned does not match scan lists entry (node number alternately flashes).	Reconfigure your module and change the addressing.
78	Slave device in scan list table does not exist (node number alternately flashes).	Add the device to the network, or delete the scan list entry for that device.
79	Module has failed to transmit a message.	Make sure that your module is connected to a valid network. Check for disconnected cables. Verify baud rate.
80	Module is in IDLE mode.	None.
81	Module is in FAULT mode.	None.
82	Error detected in sequence of fragmented I/O messages from device (node number alternately flashes).	Check scan list table entry for slave device to make sure that input and output data lengths are correct. Check slave device configuration.
83	Slave device is returning error responses when module attempts to communicate with it (node number alternately flashes).	Check accuracy of scan list table entry. Check slave device configuration.
84	Module is initializing the DeviceNet channel.	None. This code clears itself once module attempts to initialize all slave devices on the channel.

Table 7.C - Numeric Display Code Summary

Numeric Code	Description	Take this action
85	Run time data size returned from slave device is not the size expected.	Check slave device installation and configuration.
86	Device is producing idle state data while the scanner is in Run Mode.	Check device configuration/slave node status.
87	Available for allocation. Scanner has not yet been detected by allocated master, or slave mode is enabled but scanner is not allocated to a master.	Monitor scanner to determine if error code clears when master detects scanner. If error remains, check scanner slave mode configuration.
88	This is not an error. At power-up and reset, the module displays all 14 segments of the node address and status display LEDs.	None.
89	Auto Device Replacement (ADR) error. Slave device responded with an error to the initialization data sent to it by the scanner; or the configuration table in the scanner's flash memory is not valid for a slave node.	Try the ADR download again. If it still fails, try clearing the ADR flash by downloading an empty ADR configuration to the scanner and then try the ADR configuration again.
90	User has disabled communication port	Reconfigure your module. Check the disable bit in the Module Command Register.
91	Bus-off condition detected on comm port. Module is detecting communication errors.	Check DeviceNet connections and physical media integrity. Check system for failed slave devices or other possible sources of network interference.
92	No network power detected on comm port.	Provide network power. Make sure that module drop cable is providing network power to module comm port.
95	Application FLASH update in progress.	None. Do not disconnect the module while application FLASH is in progress. You will lose any existing data in the module's memory.
97	Module halted by user command.	None.
98	Unrecoverable firmware failure.	Service or replace your module.
99	Unrecoverable hardware failure.	Service or replace your module.
E9	Non-volatile configuration corrupt	Cycle power to module. Download configuration to module.

Data Map Example

What This Appendix Contains

This appendix illustrates a basic mapping example that connects a DeviceNet network to 62 simple sensor-type devices. Each device sends one data byte that contains one data bit and one status bit. These are given in response to a strobe message.

For information about	See page
Example Input Mapping Scheme	A-1
Example Characteristics	A-1
Example Framework	A-2
Example Output Mapping Scheme	A-4
Example Characteristics	A-4
Example Framework	A-4

Example Input Mapping Scheme

This example's input mapping scheme is a simplified and fixed map of discrete input data and status bits for DeviceNet devices. It is mapped to discrete inputs and the device input data table.

Example Characteristics

- strobe is used to query DeviceNet devices
- poll is disabled
- the input data bit is fixed and occupies the lowest-order bit in the lowest-order byte of the strobe (bit #1)
- one bit of status data is accepted from each node responding to the strobe
- the status data bit is fixed and occupies the next lowest-order bit in the next lowest-order byte (after the input data bit) of the strobe (bit #2)
- input and status data bits accepted from each node are mapped to the scanner's discrete input data table
- input and status data bits accepted from each node are fixed and predefined

Example Framework

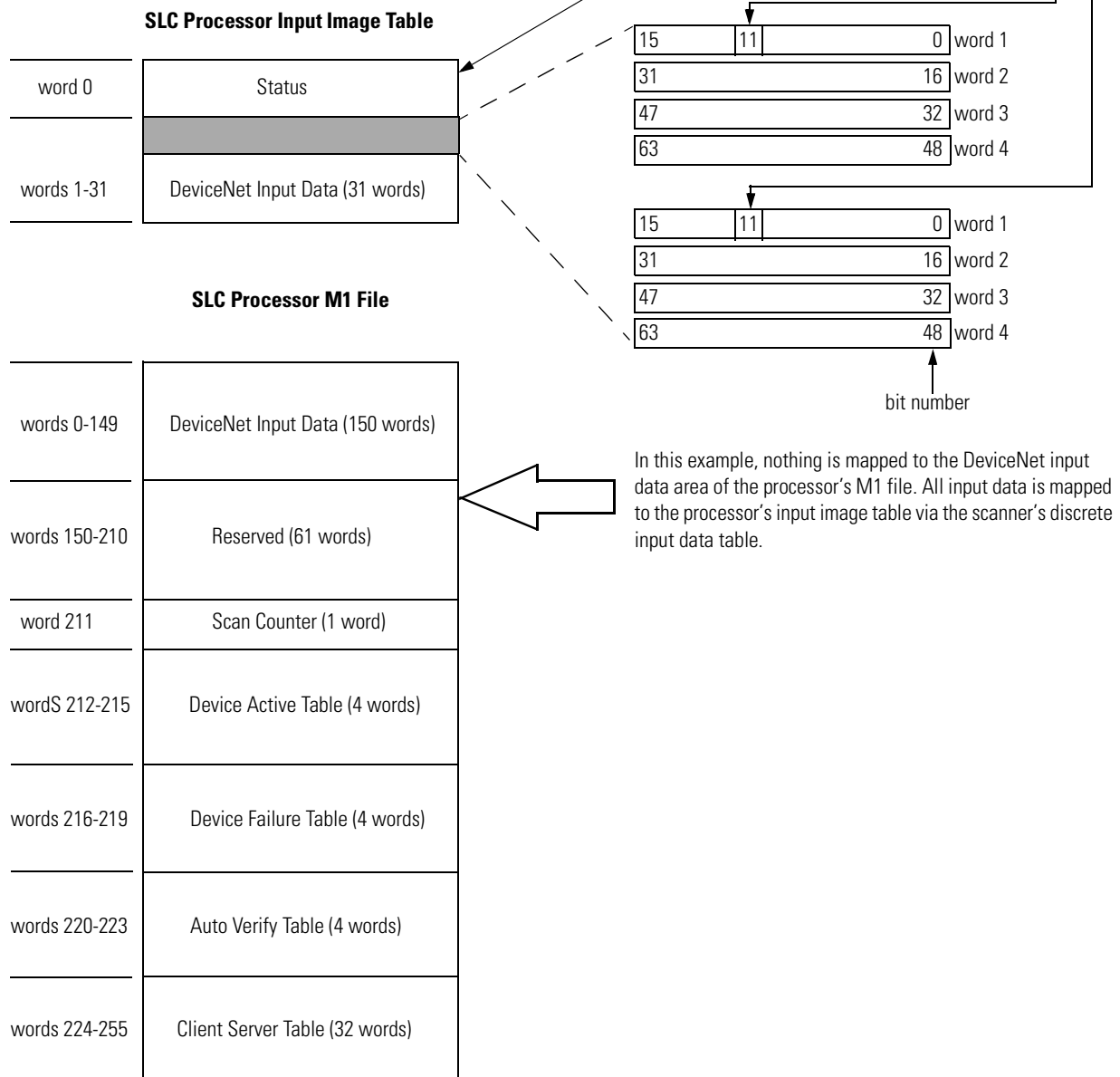
This example adheres to the following structure:

- there cannot be any 1771-SDN scanners or other 1747-SDNs on that network
- DeviceNet devices may reside only at nodes 1-62
- address 0 must be used for the scanner
- the first word in the device input data table contains the module status word (this is applicable under any mapping scheme)
- input data and status bits received from nodes 1-62 are mapped to the scanner's discrete input data table

The following illustrates an input-data mapping scheme example for the 1747-SDN scanner. Input bits are mapped from a device's message, to the scanner's input data table, and to the processor's input image table.

The status and data bits for each scanned device are mapped to the scanner's discrete input data table. Data bits are mapped in the first four words while status bits are mapped in the next four words of the table. The bit numbering for device data bits begins with 0. This numbering starts over in word 5 for device status bits. This feature makes it possible to directly correlate a device's MAC ID with the placement of its bits in the data table. For example, the data bit for node #11 is mapped to bit 11, word 1 in the data table. Its status bit is mapped to bit 11, word 5 of the data table.

The processor reads the scanner's data table to transfer its contents to the SLC processor input image table.



Example Output Mapping Scheme

This example's output mapping scheme is a simplified and fixed map of the discrete outputs and data from the device output data table to DeviceNet devices.

Devices present in the default database are strobed only; therefore, the output data-map bits are mapped into each network's strobe message. If the discrete table is available, it serves as a source for the strobe bits; otherwise, the source is found in M1/M0 file transfer locations.

Example Characteristics

- strobe is used to send output to the DeviceNet devices
- poll is disabled
- one output data bit each is sent to nodes 1-62
- the output data bits are embedded in the 8 byte (64 bit) data portion of the DeviceNet strobe message
- the output bit string source within the strobe message is divided across the discrete outputs in the scanner's discrete output data table

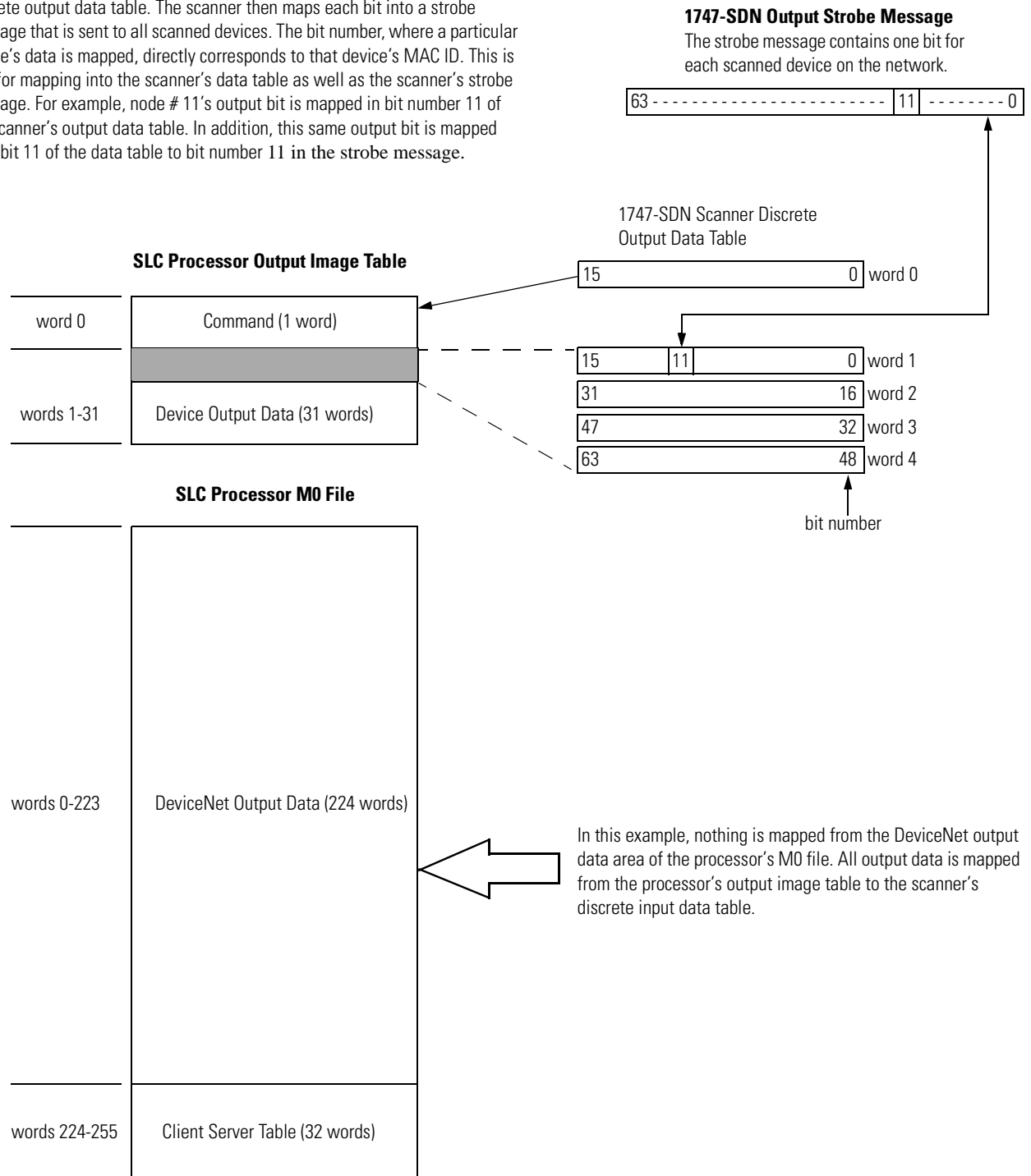
Example Framework

This example adheres to the following structure:

- when a 1747-SDN is running this configuration, there cannot be any other 1747-SDN or 1771-SDN on that network
- DeviceNet devices may reside only at nodes 1-62
- address 0 must be used for the scanner
- the first word in the device output-image data table always contains the module command word (this is applicable under any mapping scheme)
- output bits received from processor for nodes 1-62 are mapped to the scanner's discrete output data table

The following illustrates an output-data mapping scheme example for the 1747-SDN scanner. Output bits are mapped from the processor's output image table, to the scanner's output data table, and to each device via strobe message.

The processor writes output data for each scanned device in the scanner's discrete output data table. The scanner then maps each bit into a strobe message that is sent to all scanned devices. The bit number, where a particular device's data is mapped, directly corresponds to that device's MAC ID. This is true for mapping into the scanner's data table as well as the scanner's strobe message. For example, node # 11's output bit is mapped in bit number 11 of the scanner's output data table. In addition, this same output bit is mapped from bit 11 of the data table to bit number 11 in the strobe message.



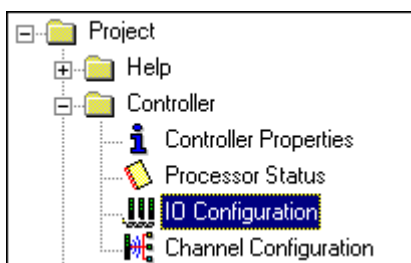
Configuring the M0/M1 Files Using RSLogix 500

RSLogix 500 I/O Configuration

To enable pass-through access using a SLC 500 processor, you must configure the M0 and M1 files associated with the 1747-SDN module at a minimum length of 361 words.

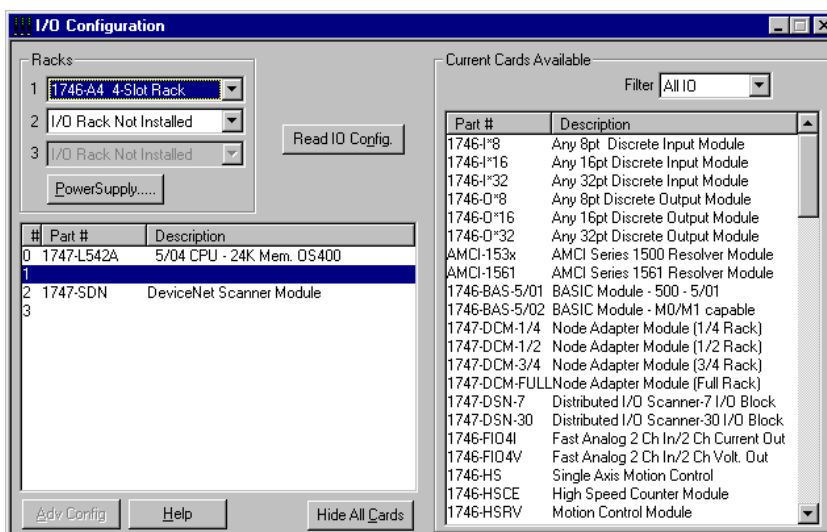
Use the following procedure to configure the 1747-SDN's M0 and M1 files using RSLogix 500 software.

1. Run **RSLogix 500** and go offline to the SLC 500 processor.



2. Under the **Controller** folder in the Project window, double-click on **I/O Configuration**.

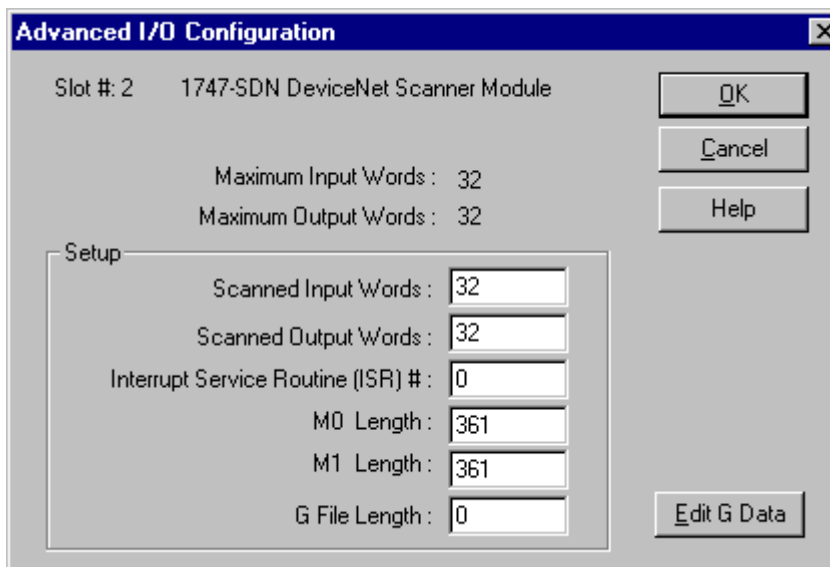
The **I/O Configuration** window will open.



3. Click on the **Read I/O Config.** button to upload the I/O configuration from the processor.

4. Double-click on the **1747-SDN** module.

The **Advanced I/O Configuration** window will open.



5. Set the **M0 Length** and the **M1 Length** to 361 (or greater) as shown above.
6. Click on the **OK** button.
7. **Download** the changes to the processor.

IMPORTANT

The SLC 500 must be placed in **Run** mode at least one time after downloading the M0/M1 configuration to enable 1747-SDN pass-through transactions.

Configuring the Processor's RS-232 Port for the ControlNet Interface

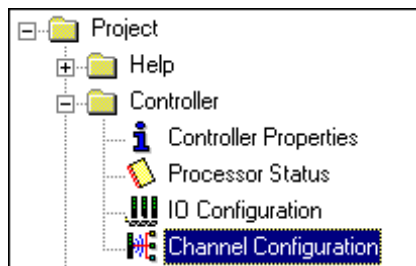
Before you can communicate with your SLC 500 processor over a ControlNet network, you must configure channel 0 (the RS-232 serial port) of the processor to match the serial port settings of the 1747-KFC15 ControlNet Interface Module.

- If you are interfacing your SLC 5/04 processor to a DH+ network you can do this configuration via the DH+ network. See chapter 6 for information on going online to the processor over a DH+ network.
- With an SLC 5/05 processor you can do the ControlNet configuration via an Ethernet network. See chapter 6 for information on going online to the processor over an Ethernet network.
- You can also do the configuration using a DF1 driver connected to the processor's RS-232 serial port. See Appendix F for information on accessing the processor via the DF1 driver.

Configuring the RS-232 Port Using RSLogix 500

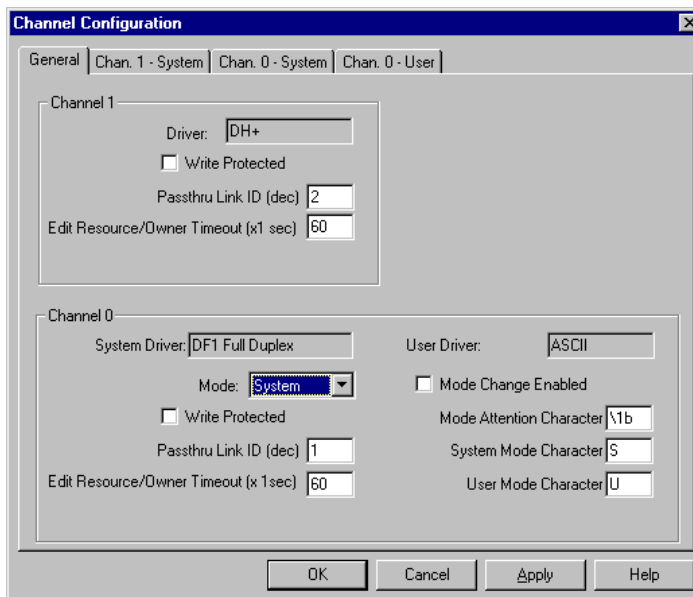
To configure the RS-232 serial port to interface with the 1747-KFC15 module perform the following steps:

1. Run RSLogix 500 and go **online** to the processor using one of the methods outlined above.

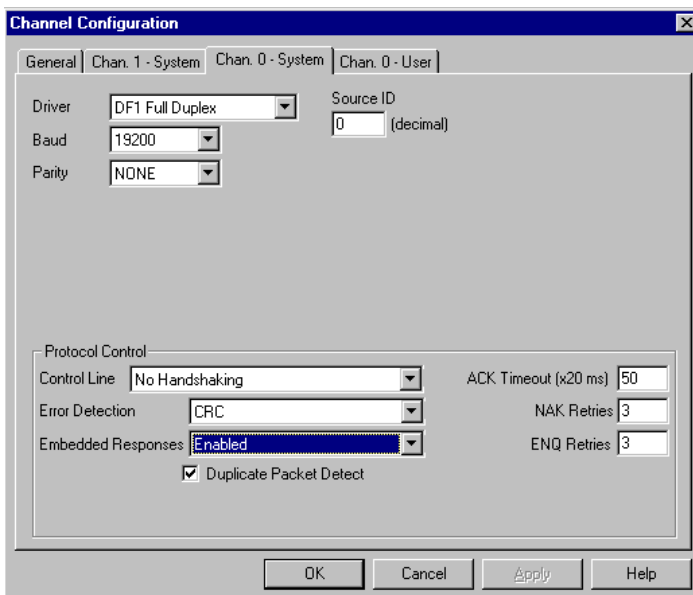


2. In the **Project** window double-click on **Channel Configuration** under the **Controller** folder.

The **Channel Configuration** window will open.



3. Make sure the **Channel 0 Mode:** is “System.”
4. Select the **Chan. 0 - System** tab. The **Channel 0 -System** configuration page will open.



5. Enter the desired configuration parameters.

For the example application we used the following settings:

Driver	DF1 Full-Duplex	Error Detection	CRC
Baud	19200	Embedded Responses	Enabled
Parity	NONE	Duplicate Packet Detect	Enabled (checked)
Source ID	0	ACK Timeout (x20 ms)	50
Control Line	No Handshaking	NAK Retries	3
		ENQ Retries	3

IMPORTANT

The configuration must match that of the 1747-KFC15 module's RS-232 serial port. See chapter 3.

6. Click on **Apply**, then click on **OK**. The new Channel Configuration will be applied to the processor.

TIP

You can also download the channel configuration to your processor along with the example application program in chapter 6.

Configuring DH+ Communications

Configuring the DH+ Communications Channel

Before you can communicate with the SLC 5/04 processor over a DH+ network, the processor's DH+ communications channel (Channel 1) must be compatible with your network. The SLC 5/04 processor's default Channel 1 settings are:

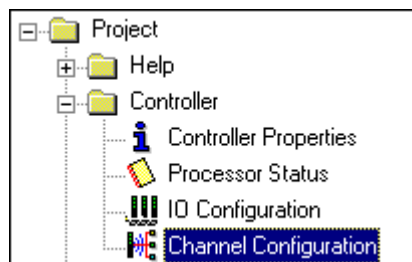
Driver	DH+
Baud Rate	56.7K
Node Address	1

If you need to change the Channel 1 settings on your processor you can do this a couple ways:

- If you are also interfacing your processor to a ControlNet network via a 1747-KFC15 module, you can configure the DH+ communications via the ControlNet network. See chapter 6 for information on going online to the processor over a ControlNet network.
- If you are not interfacing your processor to a ControlNet network you can configure the communications via the processor's RS-232 port (channel 0) using a DF1 driver (see Appendix F).

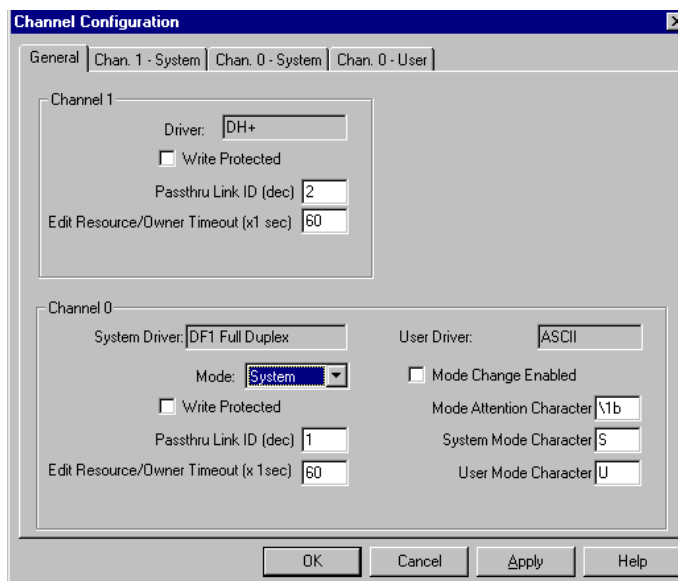
The following procedure describes how to configure the DH+ channel using RSLogix 500 software:

1. Start RSLogix 500 and go **Online** with your SLC 500 processor, using either your ControlNet driver or your DF1 driver.

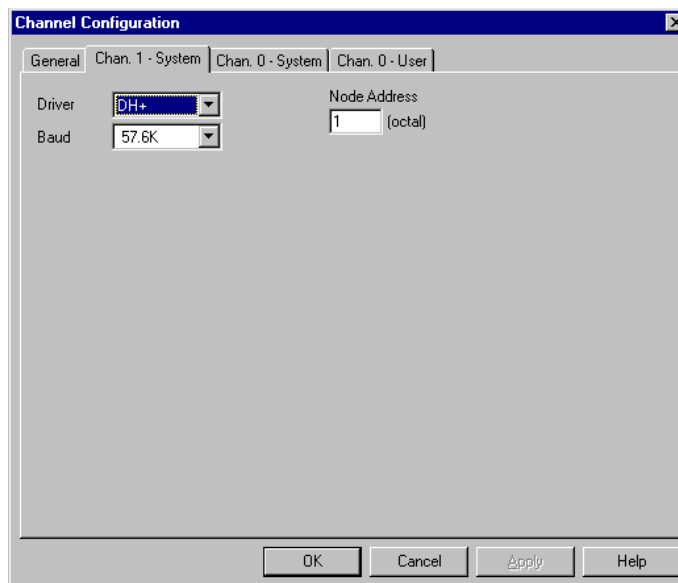


2. In the **Project** window, double-click on **Channel Configuration** under the **Controller** folder.

The **Channel Configuration** window will open.



3. Select the **Chan 1 - System** tab.



4. Set the DH+ parameters to match your network. We used the settings shown above (the default settings).
5. Click on **Apply**, then click on **OK**. The new Channel Configuration will be applied to the processor.

TIP

You can also download the channel configuration to your processor along with the example application program in chapter 6.

Configuring SLC 5/05 Ethernet Communications

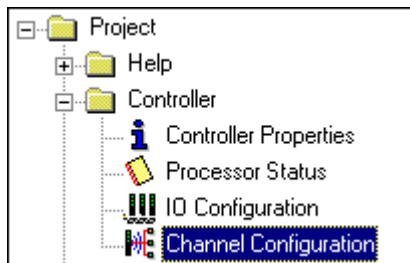
Configuring the Ethernet Communications Channel

Before you can communicate with the SLC 5/05 processor over an Ethernet network, you must configure the processor's Ethernet communications channel (Channel 1).

- If you are also interfacing your processor to a ControlNet network via a 1747-KFC15 module, you can configure the communications via the ControlNet network. See chapter 6 for information on going online to the processor over a ControlNet network.
- If you are not interfacing your processor to a ControlNet network you can configure the communications via the processor's RS-232 port (channel 0) using a DF1 driver (see Appendix F).

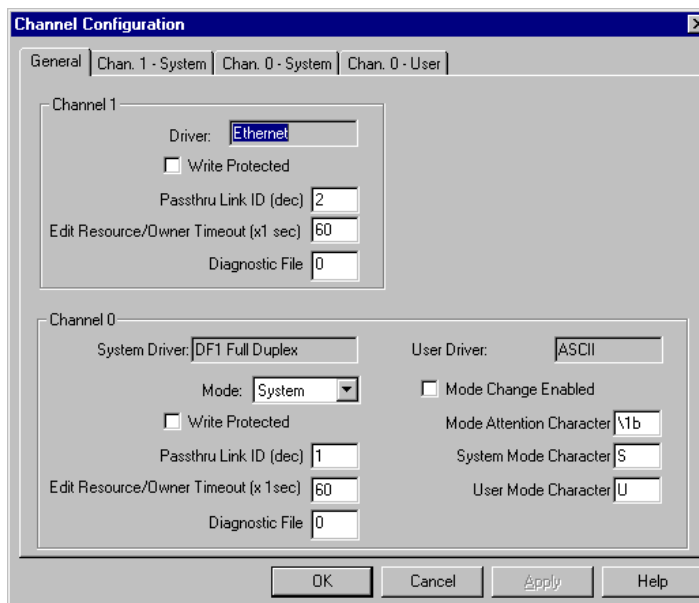
The following procedure describes how to configure the Ethernet channel using RSLogix 500 software:

1. Start RSLogix 500 and go **Online** with your SLC 500 processor, using either your ControlNet driver or your DF1 driver.

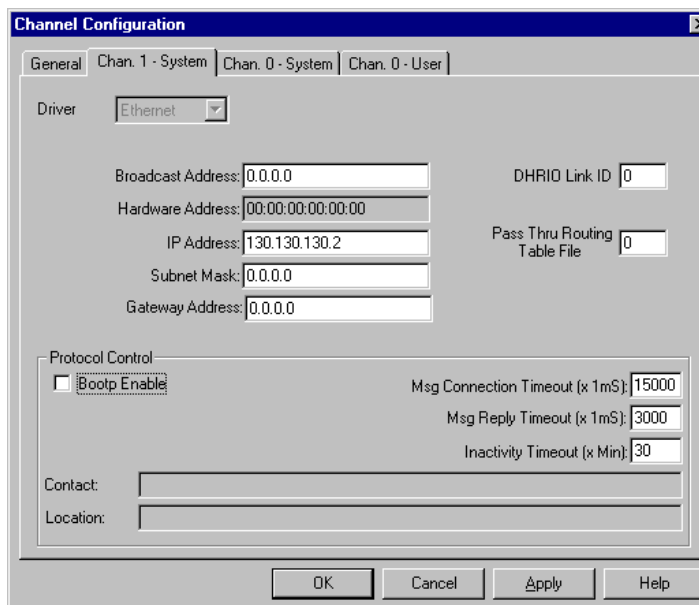


2. In the **Project** window, double-click on **Channel Configuration** under the **Controller** folder.

The **Channel Configuration** window will open.



3. Select the **Chan 1 - System** tab.



4. Make sure the **BOOTP Enable** box is **not** checked (i.e., disable BootP).
5. Enter your processor's unique **IP address** in the space provided. We used 130.130.130.2 for the example application.

IMPORTANT

You must enter the same IP Address when you configure the **Ethernet to PLC-5/SLC-5/5820-EI** driver in RSLinx (see page 5-5).

6. Leave the **Subnet Mask** at the default value.

The **Hardware Address** is filled in by the software.

7. Click on the **Apply** button and then on **OK**. The new Channel Configuration will be applied to the processor.

TIP

You can also download the channel configuration to your processor along with the example application program in chapter 6.

Configuring the SLC 500 Processor's Communication Channels Using a DF1 Driver

The SLC 500 processors used for the examples in this manual are provided with an RS-232 serial port (Channel 0) and either a Data Highway Plus port (SLC 5/04) or an Ethernet port (SLC 5/05) as channel 1.

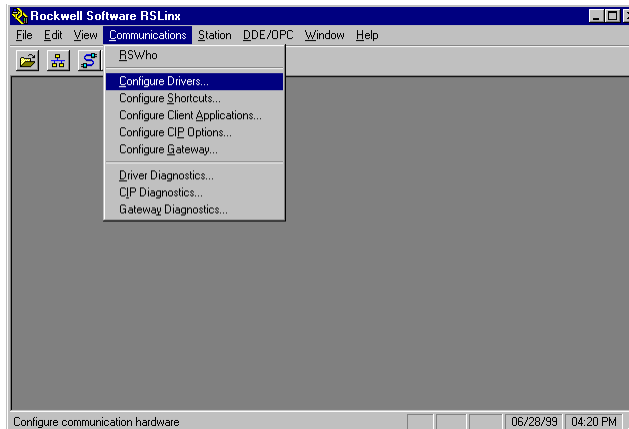
If you need access to your processor to configure the communications channels you can connect the RS-232 port to a serial port on your PC and use a DF1 driver to communicate with the processor.

You configure the DF1 driver using RSLinx software. You can then use the DF1 driver with RSLogix 500 software to configure the processor's communications.

Configuring the DF1 Driver Using RSLinx

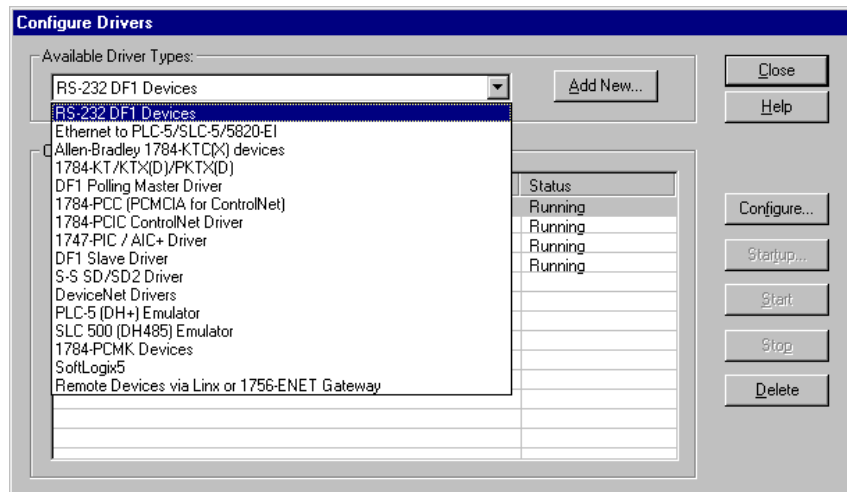
To configure the DF1 driver perform the following steps.

1. Start **RSLinx**. The RSLinx main window will open.



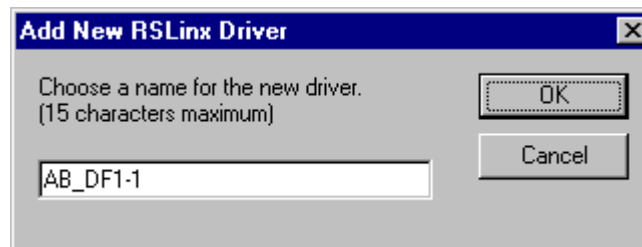
2. From the **Communications** menu, select **Configure Drivers** as shown above.

The following window will appear.



3. Select **RS232 DF1 Devices** from the pull-down list as shown above and click on **Add/New**.

You will be prompted to select a name for the new driver.



4. Select the default driver name (**AB_DF1-1**) and click on **OK**.

The **Configure Allen-Bradley DF1 Communications Device** window will open.

5. Select the serial communications port on your computer that you wish to use (e.g., COM2).
6. Under the **Device** type, select **SLC-CH0/Micro/PanelView**.

TIP



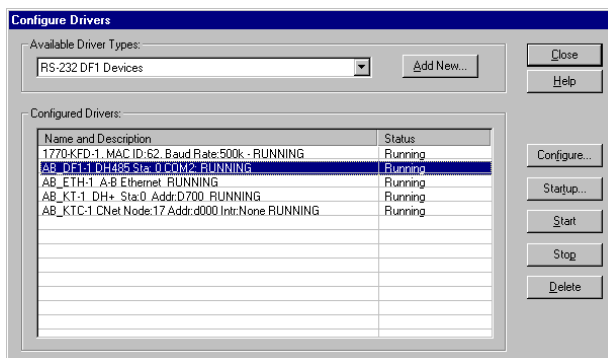
If you connect an RS-232 cable between the selected COM port on your PC and Channel 0 (the RS-232 port) on your SLC 5/04, you can click on **Auto-Configure** to define your interface parameters. We recommend that you use this method.

7. If you do not use Auto-Configure, you must enter the channel 0 parameters. The default parameters are as follows:

Baud Rate	1200 (SLC 5/04 default) 19.2K (SLC 5/05 default)
Parity	None
Stop Bits	1
Station Number	00
Error Checking	CRC
Protocol	Full Duplex

8. Click on **OK**.

The new driver will be added to the list of configured drivers. (Your list will contain the drivers you have configured on your system.)



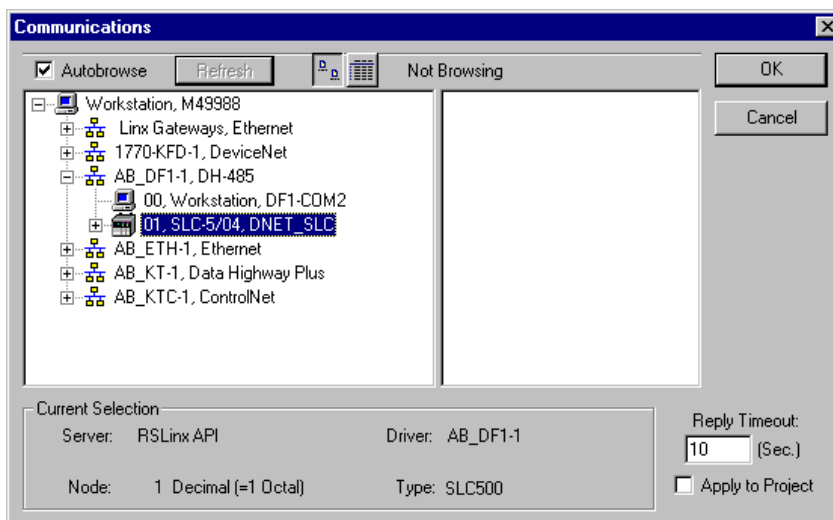
9. Close RSLink.

You can now use the DF1 driver to configure the SLC 500's communications channels using RSLogix 500 software.

Configuring the Communications Channel Using RSLogix 500

To configure the SLC 500's communications channels using RSLogix 500 and a DF1 driver perform the following steps:

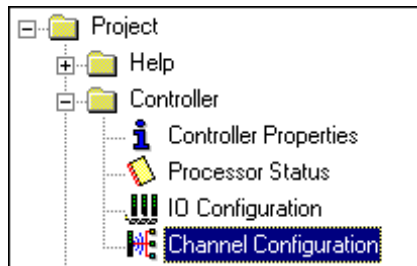
1. Run RSLogix 500.
2. From the RSLogix 500 **Comms** menu, select **Who Active Go Online**.



3. Expand the **AB_DF-1, DH 485** driver and highlight your SLC 500 processor.

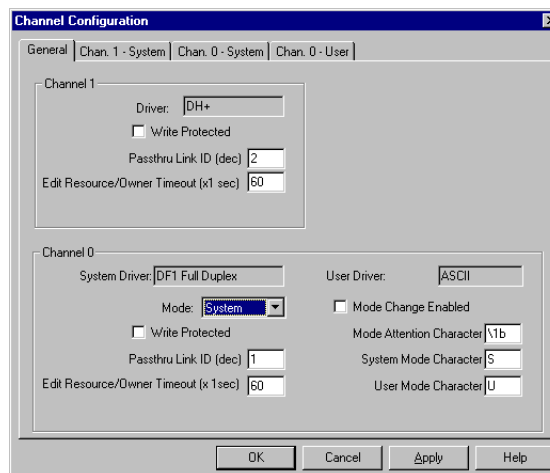
4. Click on **OK**.

On the left side of the RSLogix 500 screen you will see the **Project** window.



5. Double-click on **Channel Configuration** under the **Controller** folder.

The **Channel Configuration** window will open.



6. Select the tab for the channel you want to configure and proceed with your configuration.

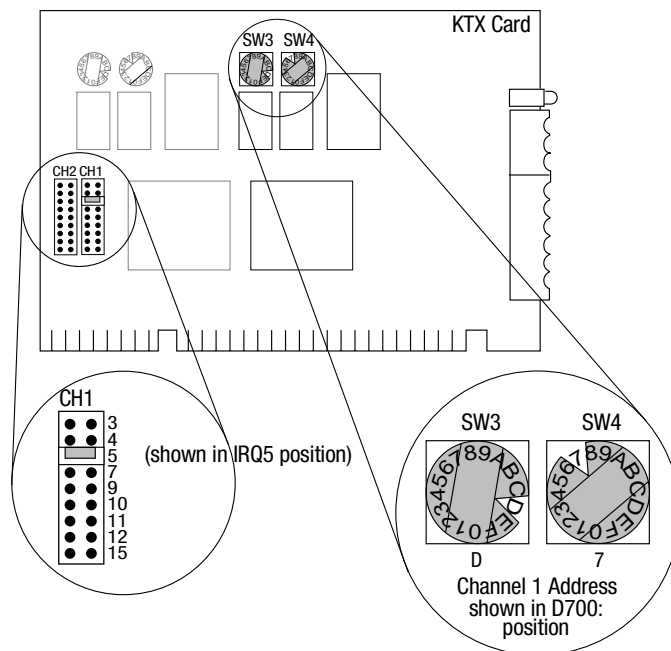
- Channel 0 - ControlNet configuration: see Appendix C.
- Channel 1 - DH+ configuration (SLC 5/04 processor): see Appendix D.
- Channel 1 - Ethernet configuration (SLC 5/05 processor): see Appendix E.

Installing and Configuring the DH+ Communications Driver

The examples in this manual using Data Highway Plus (DH+) were performed with a 1784-KTX communication interface card installed in the personal computer that was used as the programming terminal. This appendix describes how to install and configure the 1784-KTX card.

Installing the 1784-KTX Communication Interface Card

Perform the steps below to install the 1784-KTX card in your personal computer. Refer to the following figure.



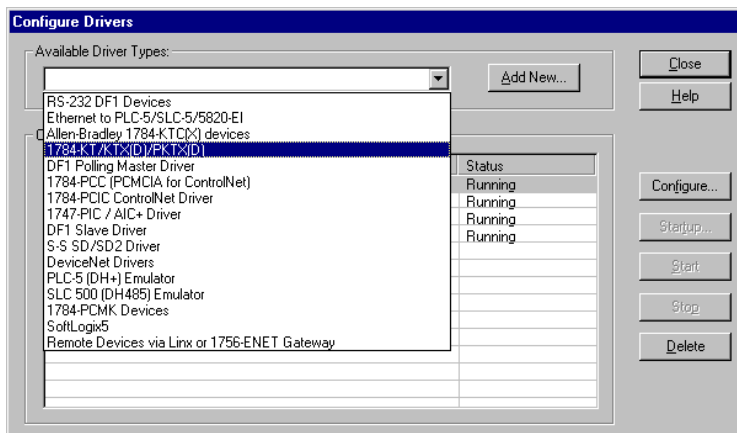
1. Set the interrupt jumpers on the communication card (IRQ5 in this example).
2. Set the switches on the card (D700 in this example).
3. Insert the communication interface card into a vacant 16-bit ISA or EISA expansion slot and tighten the screw to secure the card.

Configuring the 1784-KTX Communications Driver

After installing the card in the computer, you must run **RSLink** to configure the communications driver.

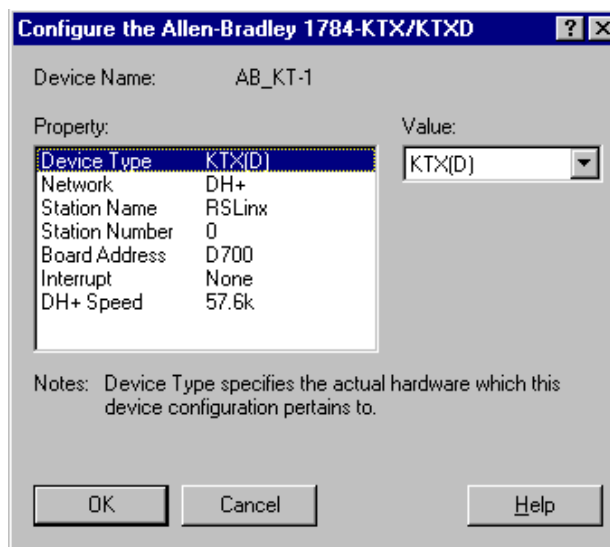
1. Start **RSLink**.
2. From the **Communications** menu select **Configure Drivers**.

The **Configure Drivers** window will appear:



3. From the list of **Available Drivers**, select the **1784-KT/KTX(D)/PKTX(D)** driver from the pull-down list and click on **Add/New**.
4. When prompted for a name for the new driver, select the default name assigned by the system, **AB_KT-1**.

The device's configuration window will open:



5. Enter the following configuration:

Device Type	KTX(D)
Network	DH+
Station Name	RSLinx
Station Number	0
Board Address	D700
Interrupt⁽¹⁾	None
DH+ Speed	57.6K

⁽¹⁾ Must match switch settings on car

6. Click on **OK** to save your settings.

7. **Close** RSLinx.



For more information, see the KTX Communication Interface Card User Manual, publication number 1784-6.5.22.

Installing and Configuring the ControlNet Communications Driver

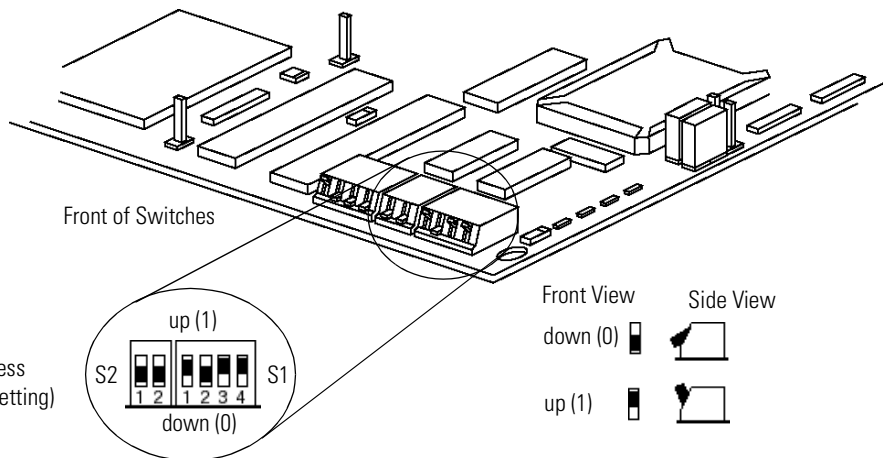
The examples using ControlNet in this manual were performed with a 1784-KTCX15 communication interface card installed in the personal computer that was used as a programming terminal. This appendix describes how to install and configure the 1784-KTCX15 card.

Installing the 1784-KTCX15 Communication Interface Card

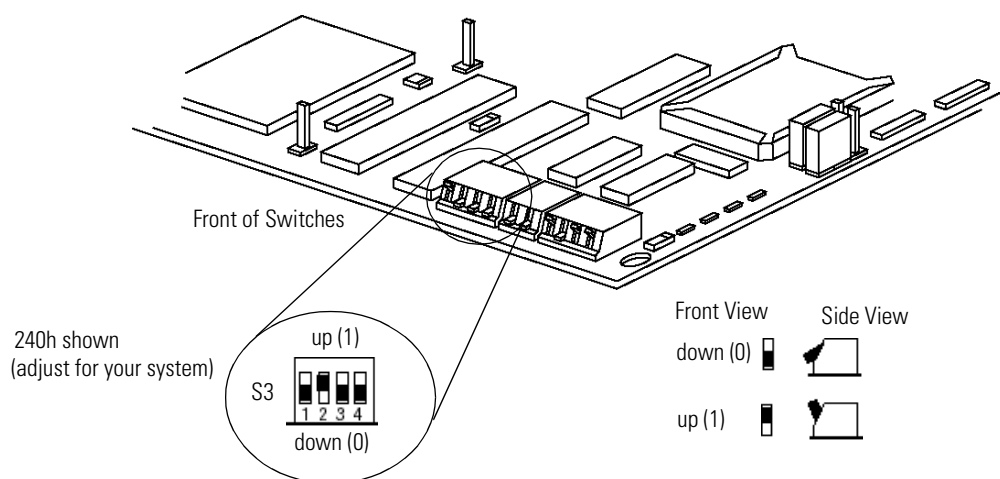


For detailed information on installing the 1784-KTCX15, refer to the ControlNet Communication Interface Card Installation Instructions,

D000:0000
Factory-set address
(recommended setting)



2. Set the card's base I/O space address location on switch S3.



These settings depend on the devices installed on your computer. We used the following addresses:

Base I/O Space Address	240
Base Memory Address	D000:000

When deciding which addresses to use, remember that each card in your computer must have a unique base memory address and a unique base I/O space memory address. If another card in the host computer is using one or both of the selected addresses, you must change the card's switch settings to an available address.

TIP

Consult with your IT/PC support group to find out if it is necessary to change any of your computer's memory address or IRQ settings.

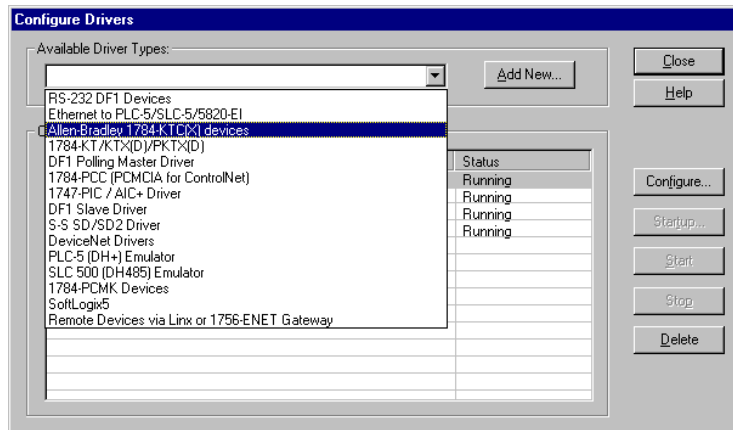
3. Insert the card in a vacant 16- or 32-bit ISA/EISA expansion slot.

Configuring the 1784-KTCX15 Communications Driver

After installing the card in the computer, you must run **RSLink** to configure the driver.

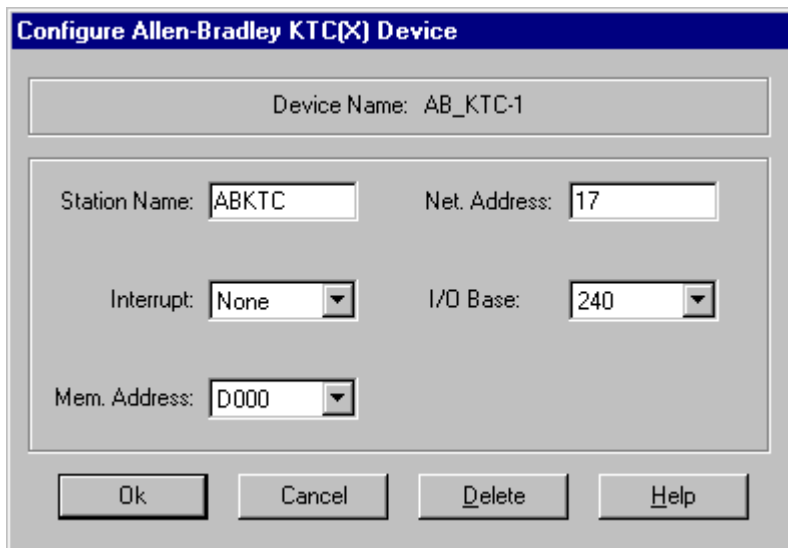
1. Start **RSLink**.
2. Select **Configure Drivers** from the **Communications** menu.

The following window will appear:



3. Select the **Allen-Bradley 1784-KT/KTC(X) device** from the pull-down list and click on **Add/New**.
4. When prompted for a name for the new driver, select the default name assigned by the system, i.e., **AB_KTC-1**.

The **Configure Device** window will appear:



5. Enter the following configuration:

Station Name	ABKTC
Net. Address	17 ⁽¹⁾
Interrupt	None
I/O Base	240 ⁽²⁾
Mem. Address	D000 ⁽²⁾

- (1) This is an unscheduled device. For maximum efficiency, set its address higher than the highest scheduled address on your network.
- (2) Modify as necessary for your system.

6. Click on **OK** to save your settings.

7. Close RSLinx.

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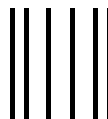
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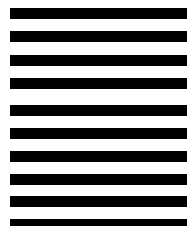
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User Manual